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Creative dance and cognition: A study on physical expression of concepts

by

Andrea Infantini de Almeida

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Dr. Marcel Boumard

Dr. Jeffrey Bisanz

Professor Linda Rubin

November 13, 2006

Dedication

I would like to dedicate this thesis to my son Daniel, whose energy and love motivated me to get to the end of this long and enjoyable journey.

Abstract

It is often claimed that creative dance enhances children's abilities to express thoughts through movement (Drewe, 1996; Stinson, 1988). The purpose of this study was to investigate this claim empirically. It was hypothesized that children with creative dance background should perform better than children with ballet or no dance backgrounds in tasks involving physical expression of concepts.

Three groups of children (N=35) 6 to 7 years of age selected from creative dance, ballet, and public schools were administered the Test of Gross Motor Development (Ulrich, 1985), the Torrance Thinking Creatively in Action and Movement (Torrance, 1981), and an experimental task on physical expression of concrete and abstract concepts. TGMD and TCAM results showed no differences among groups regarding motor skills and creativity in movement. The experimental task showed no significant differences between the groups, indicating that exposure to creative dance does not appear to enhance children's physical expression of concepts.

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CHAPTER 1: INTRODUCTION

Overview of the Study

Creative dance is often viewed as an important element of a child's physical and intellectual growth (e.g., Drewe, 1996; Joyce, 1980; Stinson, 1988). It has been seen as an art form, a physical education activity, and an educational tool in the school setting (Drewe, 1996; Joyce, 1980; Stinson, 1988). Some claim that creative dance as an art form may foster the discovery and exploration of aesthetic and artistic notions through movement in early child development (Joyce, 1980; Stinson, 1988). Others have viewed creative dance as a physical activity that enhances locomotor skills and coordination, space perception, and awareness of the body parts (Drewe, 1996; Wall & Murray, 1989). Creative dance is also viewed as a teaching and learning tool in the understanding and exploration of other school subjects in the elementary school curriculum. When part of the regular elementary curriculum, creative dance can be taught along with math, sciences, geography, grammar, etc. (Drewe, 1996; Joyce, 1980; Smith-Autard, 1994; Stinson, 1988).

Creative dance is an educational activity in which children may be exposed to an aesthetic and artistic experience, and can also exercise both their creative potential and their cognitive development (Stinson, 1988).

Despite all these claims, very few empirical studies have addressed the role of creative dance in children's education and development (Jay, 1991; Roseman, 1984; Wall, 1971). Of this small number of studies, none have investigated the potential intellectual benefits of creative dance. Therefore, it is unclear whether or not any of these

claims are valid with respect to the specific effect of creative dance on children's physical and intellectual development. This thesis aims at filling this gap by combining the areas of dance education and cognitive developmental psychology. The intersection between these areas in the context of the study of creative dance has not yet been fully explored.

In this study, three groups of participants between 6 and 7 years of age were selected: a group with creative dance background, a group with ballet background, and a group with no dance background. The participants completed two standardized tests and one experimental task. First, the Test of Gross Motor Development (TGMD; Ulrich, 1985) was used to assess gross movement control. Second, The Torrance Thinking Creatively in Action and Movement test was used to assess creativity in movement (Torrance, 1981).

In the experimental task, children were presented with several tasks involving different types of concepts (concrete and abstract) for physical expression. Data were obtained in the form of a rating questionnaire designed by the investigator based on the combination of Guilford's aspects of creativity (1967) and Laban's elements of movement (1975) as observational criteria. The goal was to assess the differences – if any – between the three groups in the physical expression of concepts. As postulated by some authors (e.g., Drewe, 1996; Stinson, 1988; Zukowski & Dickson, 1990), creative dance might exercise problem-solving capacities by challenging and stimulating the cognitive system. If this is true, then it is expected that children with a creative dance background should perform better in tasks involving physical expression of concepts, since concepts are assumed to be the primitive elements of higher thought processes (Fodor, 1994).

Definitions

The following are simple working definitions of some terms used throughout this thesis. Some of these terms are further elaborated on in the body of the text.

Ability. "An ability is a relatively stable, underlying trait that is largely unmodifiable by practice on a particular task or activity" (Schmidt & Lee, 1999, p. 236).

Body Language. As approached in this research, it is the *mental representation* of either a single movement or a more complex sequence of movements. Body Language can be seen as concepts that are part of a vocabulary of movements that are mentally represented.

Cognitive Capacity. Cognitive capacity refers to the mind's ability to process or produce information pertaining to a certain domain. According to Feldman et al. (1994, p. 3), cognitive capacity comprises all forms of "human capacity such as mathematical, musical, and spatial intelligence".

Concepts. Concepts are elementary mental representations: they are the atoms of thought, symbolic units in the mind standing for objects and categories in the world (Fodor, 1994).

Creative movement/creative dance. In this study, "creative dance" and "creative movement" are used as synonymous. Creative movement/dance "has been defined by many dance practitioners and theoreticians as an expression of the inner self through the medium of movement" (Drewe, 1996, p. 17). Dimondstein (1974) defines creative dance as "the interpretation of a child's ideas, feelings, and sensory impressions expressed symbolically in movement forms through the unique use of his body" (p. 167).

Creativity. A detailed discussion of the different notions of creativity is presented in Chapter 2. As approached in this study, creativity will be seen as a process that generates ideas and complex expressions in the Thought Language (see below for details).

Flexibility. According to Guilford and Hoepfner (1971), flexibility can be seen as an ability to make shifts in thinking or to change responses in order to solve a problem task.

Fluency. According to Guilford and Hoepfner (1971), fluency can be seen as an ability to produce as many different responses as possible to solve a problem task.

Laban Movement Analysis (LMA). LMA is a movement language used to describe the elements and qualities of movement such as body awareness, space awareness, awareness of weight, time, and flow (Drewe, 1996, p. 17). LMA can be seen as the essence of the creative dance framework. The LMA framework provides children with a common locomotor and nonlocomotor vocabulary of movements as they explore problem-solving tasks by transforming movement ideas into actions.

Motor Ability. As employed in the present study it is " a relatively stable characteristic or trait that contributes to performance in certain ways. These traits are usually thought of as being either genetically determined through the relatively automatic processes in growth and maturation, and they are not easily modifiable by practice or experience. Abilities represent a collection of 'equipment' that one has at his or her disposal that determine whether or not a given motor task can be performed either poorly or well" (Schmidt, p.395).

Originality. Originality is the ability to produce "clever" responses that are new, unique, unusual to solve a problem task as judged by observers (Guilford & Hoepfner, 1971).

Skill. Skills are "movements that are dependent on practice or experience for their execution as opposed to being genetically defined" (Schmidt & Lee, 1999, p. 20). Moreover, skills can be learned and modified with practice.

Thought Language. The language of cognitive processes or thought; it has a vocabulary of elementary mental representations, a syntax, and a semantics; it forms complex expressions ("sentences") from the elementary ones (Fodor, 1975).

Purpose

The purpose of this study was to address the possible benefits of creative dance for children's physical expression of concepts. The theoretical approach taken in this study focuses on creative dance, not only as an aesthetic experience or an art form, but as *a physical activity that challenges the cognitive capacity of young children once they are faced with the problem of expressing ideas as movement.*

Hypotheses

It was hypothesized that children with a creative dance background would be more skilled at tasks involving physical expression of concrete and abstract concepts than children without such a background. Also, it was hypothesized that the performance of children with no dance background on tasks of physical expression of concepts would not differ from that of children with a ballet background.

Significance of the Study

The results of this study may indicate the importance of creative dance experiences to the development of children's cognition. Given the importance attributed to creative dance by many authors (e.g., Drewe, 1996; Joyce, 1980; Smith-Autard, 1994; Stinson, 1988), and the popularity of creative dance in many school systems, understanding its true contribution to cognitive development is fundamental for fields such as education and psychology.

Limitations

Some of the following limitations may have had direct influence on the results of this study.

(1) The study was limited to a dance studio where the experimental tasks were administered in a delimited space. Children may have experienced stress or anxiety when asked to perform the tasks individually in front of a "stranger".

(2) Only volunteer children from three different backgrounds (Creative Dance, Ballet, and No dance) and several schools in Edmonton, Alberta were included in the study

(3) The presence of a video camera may have affected the children's performance on the tasks.

(4) Another possible limitation of the study was that, due to the relatively small sample size, the power of statistical analyses is likely to be small.

(5) There was a lack of randomization making difficult to detect whether in fact there was any "cause" effect of creative dance training on the creative dance group. Notice that the development of creativity is a lengthy process making it impossible to train the children at the time of the study. Therefore, a quasi-experimental study was used.

Delimitation

The study was delimited to four movement tasks involving the physical expression of concepts. The task structure was the same, but four different concepts (two concrete and two abstract) were used for each child.

CHAPTER 2: LITERATURE REVIEW:

CREATIVE DANCE AND COGNITION

This chapter reviews theoretical issues related to different approaches to creative dance, cognition, and creativity, as well as their relevance to the study. Also, the LMA and its relevance to creative dance classes are discussed.

Creative Dance - What Is It?

There are many definitions of creative dance. Some researchers (e.g., Joyce, 1980) believe that creative dance is a way of communicating through movement. According to this view, using the elements of movement fosters a unique learning experience that focuses on self-awareness and imagination. Several researchers (e.g., Stinson, 1988) believe that creative dance is the most natural form of dance for young children, and that it helps to develop body awareness, aesthetic experience, and cognitive learning during the early stages of child development. Zukowski and Dickson (1990) view creative dance as a physical activity that addresses kinesthetic experience and as a problem solving situation that may allow children to discover dance as an art form. Finally, others view creative dance as a dance form that uses the elements of movement (e.g., body, space, time, flow, etc.) to express thoughts and feelings (e.g., Joyce, 1980; Smith-Autard, 1994; Stinson, 1988). Drewe (1996) stresses the aesthetic side of creative dance as being more important than the physical side of creative dance in children's education. According to this view, creative dance should be approached as an art form

taught in the school curriculum in order to enhance learning of other subjects. In this section we will examine each of these views.

Joyce's View

Joyce (1980) views creative dance as an exploratory experience that should be introduced to young children as a vehicle for learning and communicating through body movements. According to her, "the language of dance is movement and the instrument of movement is the human body" (p. 1). She proposes several "elements" to the experimental aspect of dance; elements such as body, space, force and time. These elements play a specific role in the discovery of movement and its context in our world. She argues that through the creative dance class children are motivated to discover and experiment with each and every one of these elements in order to understand and create their own movement forms.

Joyce addresses the importance of the fact that teaching creative dance to young children can be a unique learning experience that can target the child's self-expression, awareness, and control of movement, thus giving children a full movement experience that allows them to explore their imagination in a way that cannot be done through other art forms. Moreover, according to Joyce, creative dance can be experimented with as a part of school curricula. Many of the school subjects can be learned along with movement experience, as long as the teachers and the school system are willing to offer children the right guidance for using movement experimentation as a different tool for teaching other subjects.

Although Joyce's views are interesting from a pedagogical point of view,

specifically in stressing the relevance of teaching creative dance to young children, she does not support her claims with any empirical data. This appears to be a common trend in the discussion of creative dance, as we will see in other approaches.

Stinson's View

Stinson (1988) discusses the role of creative dance in children's early development. She claims that creative dance is the most appropriate art form of dance for preschoolers because it explores natural movements. While experiencing this kind of activity, children have a chance to discover dance from a new perspective. As she puts it, creative dance plays a specific role in children's education; in developing both body awareness and cognitive processes. According to Stinson (1988, p. 2):

> To dance is to discover the new world of sensory awareness. Awareness of movement is made possible by the kinesthetic sense, and it comes from the nerve endings in our joints and muscles. This sense tells us what our body is doing; it ordinarily works with the visual sense but even operates when our eyes are closed. Some degree of kinesthetic awareness is essential if we are to master skills with our bodies; the better developed it is, the more complicated the motor skills we are able to learn and perform. If the kinesthetic sense is acute, it even allows us to feel motion we see others doing; we can actually feel the tightness in a worried friend or feel a stretch in our own bodies as we watch a basketball player reach toward the basket.

Stinson mentions body awareness, concentration and focus, awareness of and respect for others, contribution to classroom operation, cognitive learning, and self-

esteem as topics to be addressed through the dance lesson. She says that according to Piaget's pre-operational and concrete-operational stages of cognitive development, dance can be seen as an important factor for preschool children. While discovering dance, children are having a "concrete" experience (movement) through which they can develop awareness of the movement (through kinesthetic experience), and awareness of their bodies and the world around them. From her perspective, dance requires, among other things, awareness of the movement in order to focus on the movement itself. Overall, she emphasizes the idea that creative dance is the most appropriate art form for young children because creative dance can possibly connect movement and cognitive development (e.g., Drewe, 1996; Smith-Autard, 1994; Stinson, 1988).

Zukowski and Dickson's View

Zukowski and Dickson (1990) state that creative dance is important for several areas of children's development: it is stated by the authors that creative dance can "improve motor, conceptual, social, and emotional" areas of development (p. 2). Dance is one special way for children to use their imagination, to develop self-awareness through movement while they are playing, and to construct their own ideas of dance. While involved in creative activity, they say, students can find strategies to face " problem solving" by themselves, which means they will think about new ways to use their bodies. Also, according to Zukowski and Dickson (1990), creative dance promotes the development of an "aesthetic awareness" of the body. They claim that, through dance, children become more conscious of their body parts and their function.

These authors say that the "kinesthetic sense" can also be developed in a creative dance program. With creative dance, they claim, children can learn how to use their sense of awareness (their sense of how to feel the movement) while moving. Children will "feel successful and appreciated because there is no right or wrong way to move" (Zukowski & Dickson, 1990, p 3).

Zukowski and Dickson also say that when children "use their bodies, minds, and imagination in their movement activities and dance improvisations, or when they see others' improvisations, they have an aesthetic experience" (p. 4). So, creative dance, as a well-structured activity, can be an important part of children's intellectual and physical growth.

Overall, Zukowski and Dickson stress the role of creative dance from cognitive and aesthetic perspectives, suggesting that creative dance is a rich experience for young children. Moreover, they argue that children's imaginations seem to be fully involved in creative dance activities, thus this form of movement exploration enriches children's cognitive capacity for solving problems.

Drewe's View

Drewe (1996) states that "creative dance involves helping students learn how to give form to their thoughts and feelings through movement" (p. 24). Creative dance can be taught by elementary school teachers who can guide students in the process of expressing ideas and feelings through the unique use of their bodies. She addresses the relevance of Laban's (1975) framework as a way of understanding and discovering the elements of movement (body awareness, space awareness, time, weight, flow, and

adaptation to partners and groups). Through the understanding and use of these elements, Drewe says that children are able to create and express their own movement ideas. Laban's vocabulary of movement and movement qualities can be used to enrich one's self-expression in movement, thus allowing for the creation of a more expressive dance. Also, the appropriate use of the elements of movement addresses the aesthetic qualities of a dance form.

We can summarize these views by saying that creative dance is seen as a very specific form of dance education. It is a physical and aesthetic experience that explores the expression of the inner self, thoughts, and feelings through the language of the body. Creative dance is a particular type of dance that may play a role in different aspects and stages of a child's development. We can divide and briefly comment on three elements of creative dance—physical, aesthetic, and cognitive – and how they each impact a child's development (Drewe, 1996; Joyce, 1980; Stinson, 1988; Zukowski & Dickson, 1990). When we look at creative dance from the physical perspective, we can see that it might develop and refine gross motor skills by virtue of being an activity that incorporates fine and gross locomotor movements. This challenges children's physical skills and allows them to express and create their own movement ideas.

When we look at the aesthetic side of creative dance, we can say that creative dance relies on the use of the elements of movement. These elements are body awareness, space, weight, flow, and time. These elements provide a child with ways of understanding, exploring, and appreciating movement as an art form and they each have

specific aesthetic qualities (Laban, 1975), which allow one to create and elaborate on a large range of movements as an art form.

Finally, when looking at the cognitive aspect, creative dance is a physical activity that challenges a child's mind to solve movement problems and to convey and communicate ideas through movement.

All the views mentioned above regarding creative dance seem to agree on what creative dance is and, most importantly, the role it may play in children's education and development.

However, as noted earlier, none of these claims about the benefits of creative dance are supported by empirical studies. Although there is a general sense that creative dance is beneficial for young children, it is not clear whether or not creative dance has the special status of being a physical activity that fosters cognitive development, as the authors briefly reviewed above have suggested. In fact, it is not clear if creative dance is any better than any other activity in which children tend to engage.

Creative Dance and Cognitive Development

As we have seen, creative dance is generally thought of as an important tool in the educational setting. As demonstrated in the previous section, many authors (Joyce, 1980; Russell, 1975; Stinson, 1988) have pointed out that creative dance can be used as a pedagogical instrument in the teaching of many content areas in elementary, middle, and high schools (National Dance Association, 1994). Moreover, it has been claimed that creative dance involves unique aspects of children's development such as bodily and spatial awareness, aesthetic experience, and imagination (Stinson, 1988).

Cognitive psychology has come to understand many aspects of the nature of children's cognitive abilities. One can probably trace the beginning of the field to Piaget's early studies on the role of play in fostering children's cognitive development (e.g., Droz & Rahmy, 1978; Siegler, 1986).

According to Siegler (1986), Piaget suggests that children learn by interacting with the environment and other children through play. Through symbolic play, in particular, children leave the stage of pure imitation and enter into the practice of pretend or dramatic play, acting as if they are other people or things. Several researchers (e.g., Carey, 1990; Flavell, 1985) have emphasized the importance of this turning point (which begins at about 3 years old and culminates at about 6 years old) for children's cognitive development. During this symbolic stage, children are said to expand their knowledge of the world and make sense of it, to act as if they are other people or things, to develop skills such as drawing and using numbers to represent quantities, to develop social skills, to be creative, etc. (Droz & Rahmy, 1978; Flavell, 1985; Slavin, 1988).

In the post-Piaget era, cognitive psychology has been dominated by the symbolic-computational approach (Carey, 1990). From this perspective, cognitive processes are seen as computational processes in which symbols are the elementary mental representations on which cognitive processes act (see Fodor, 1975). According to Fodor, symbolic representations are mental encodings of properties of the world. These are "word-like" representations in which, for example, DOG (the symbol, not the English word) is the mental representation for the word *dog* and stands for the mental representation of the actual animal dog. That is, DOG is a symbol; a concept that stands

as a mental representation for all of the dogs in the world. Symbols, as the elementary mental representations, form the basic vocabulary of mental processes. These processes are taken to constitute a mental language of symbols. So, for example, when we think FIDO IS A DOG, we are manipulating the symbols (or concepts) FIDO, IS-A (a relational concept), and DOG, and concatenating these symbols into a complex thought expression (which is a sentence-like representation) FIDO IS A DOG. Any cognitive activity in which a child or adult engages is assumed to involve the manipulation of this language of symbols or language of thought (Fodor, 1975).

Creative dance can be construed as a kind of symbolic play in which children are constantly exploring mental processes (imagination in particular) that involve a child's ability to express either a simple concept in Body Language or a more complex thought expression in Body Language. In other words, creative dance could be seen as a form of dance education that might stimulate children's cognitive process by transforming Thought Language into Body Language. Creative dance can therefore be seen as a structured activity that nurtures the symbolic process whereby body and mind are "exercised" together through children's ability to use their imagination. This means that when children are given a certain task, or when they are given freedom to exercise their imagination in creative dance, they manipulate Thought Language, which in turn is translated into body expressions. For example, when a child explores the concept RAIN (or any other concept) it is necessary for the child to first entertain the concept of RAIN and the concept RAIN is then translated into a body expression (a single movement or

"phrase" of expressive movements) that physically represents, through movement, that particular concept.

Creative dance thus can be seen as a form of cognitive activity in which thought expressions are "translated" into Body Language expressions. Details about how this can be achieved are yet to be worked out, as discussed in the next sections. Suffice it to say for now that through this process of "translation" an idea is first entertained and then expressed into movement actions or a sequence of movement actions. Such a process relies on each child's intellectual and physical capacity to be more or less expressive while solving a movement task. The role of creativity, thus, is that of "generating" the ideas for movement sequence. This is so because there is no "direct" translation between a concept and a movement. There is in fact an arbitrary relation between an idea or concept and a particular sequence of movements. We can assume that the more elements of movement involved in the expression of a particular concept, the more the child has developed or exercised the "translation" between ideas and movement expression, that is, the more the child has developed the Thought Language-Body Language interaction.

The Representation of Movement Actions

The hypothesis that there is a translation mechanism between thought expressions and actual movement actions has gained support more recently in the work of Rosenbaum and his/her colleagues (e.g., Rosenbaum, Carlson, & Gilmore, 2001; Rosenbaum & Krist, 1996; Rosenbaum, Loukopoulos, Meulenbroek, Vaughan, & Engelbrecht, 1995). Although their work does not deal directly with complex movements (or, as they call it, "series of multi-degree-of-freedom movements") such as dance or

athletic performance, we can further extend their discussion to apply to the case of creative dance. Rosenbaum and Krist emphasize the idea that for every movement there are representations that encode – in terms of a motor program – the forthcoming activities. Rosenbaum et al.'s (1995) model is based on three major claims: (1) there are stored posture representations which are the basis for movements or activities; (2) those representations are accessed (or "activated") according to their "fit" to the task at hand; and (3) what is produced (the "output") is "based on the pooling" (p. 28) of all accessed representations. So, for instance, for a simple motor program (or "multi-degree-of-freedom movements"), such as extending the arm to grab an object, it is necessary that the agent performing the activity represent the appropriate trajectory of the arm in terms of range of motion. To illustrate, for someone to extend an arm to grab an object that is standing at a certain distance from the agent, there are at least four ways of performing the action (see Figure 1).

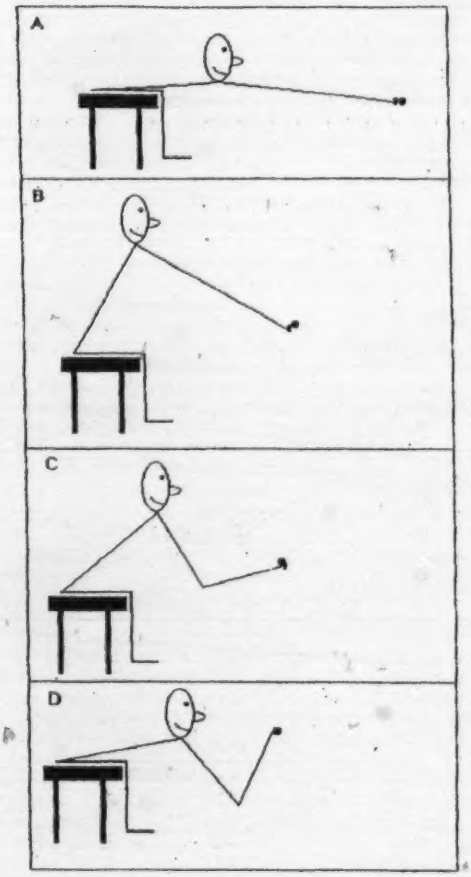

Figure 1. Four different ways of performing a movement action based on the degrees of freedom of the elbow (from Rosenbaum et al., 1995, p. 29).

It is possible that creative dance involves accessing series of stored postures (starting and target postures), symmetry of movement sequences, kinematics, and many types of stored motor programs or pieces of motor programs that give rise to complex action. It can be said, thus, that creative dance – as with any complex action – involves all

types of representations required for any given complex action. The problem with this approach is that it still does not account for the problem of a virtually constraint-free type of sequence of movements (or "series of multi-degree-of-freedom movements"), which are characteristic of creative dance movements. While the motor behavior of reaching to grasp an object involves accessing and pooling stored representations, the nature of the movements involved in creative dance tasks are far more complex. Since the only limitations to expressive movement such as creative dance are biomechanical, the sequence of movements or the motor program that the child is going to create to physically perform a concept will have to be the product of the child's own imagination. This is because the idea of simply representing a concept such as LION will not necessarily involve stored representations, but will involve novel sequences of movements beyond normal target postures found in common reaching-and-grabbing tasks as used in many motor control studies.

Thus, according to this view, the postulation of a creativity mechanism that "translates" concepts or ideas about objects (Thought Language) into movement programs or movement representations (what we referred to as Body Language) appears to be a necessity. The suggestion here is that since for every given limb movement there are numerous possibilities (or multiple degrees of freedom), the choice of which movements will be performed will have to be the product of the child's own creation. In sum, transforming ideas about objects and abstract concepts into sequences of complex movements will be the role of a "creativity" component, which takes concepts as inputs (e.g., the concepts that are to be performed in a given task such as LION or LOVE) and

produces sequences of motor commands that are eventually executed by the motor system. Here we are making a distinction between the representation of the movement sequence, as created by this "creativity" component, and the movement itself, which is an observable act.

Laban Movement Analysis and Its Relevance for Children's Dance

Although Laban (1975) has not developed a full-fledged theory of motor control, he offers a framework for the classification of elements that constitute the vocabulary of movements in the context of dance. These elements are classified according to effort actions. According to Laban, the basic elements of movement are space, flow, shape, time, and weight. The *space* is the place in which the body moves; it has sub-elements (directions, pathways, and levels) that help one to understand a specific movement or gesture. The different movement qualities employed in the movement action are also important in Laban's framework. For instance, the element of flow has specific qualities that can be observed and analyzed within the dance context. The *flow* element is a movement action that can be stopped or held at any moment during the actual movement (Laban, 1975, p. 56). The flow qualities are bound or free. A bound flow of movement is a stoppable, constrained movement. A free flow is an unstoppable, continuous movement. Along the same lines, Laban classifies the other three elements of movement according to their particular qualities. The *shape* element is identified by the manner in which the whole body is arranged or its parts are arranged in relation to each other. Shapes are big or small, symmetrical or asymmetrical, and sometimes with a specific free or bound quality. The *time* element is the length of time that something lasts (Rubin,

1991). For example, it can vary between slow or fast pace, sudden or sustained, and so on. It all depends on the intention of the human action or the idea to be expressed. The *weight* element is an effort quality that can be identified by the transfer of energy through the body and its parts (i.e., heavy or light).

According to Davis (1995), when using LMA, in order for children to learn about dance concepts, develop movement ideas, and create their own movements, they must manipulate the elements that make up the foundation of Laban's analysis; space, flow, shape, time, and weight (Drewe, 1996). Rather than teaching children preconceived concepts and materials that could be learned by imitating and automatizing movement sequences, LMA emphasizes children's different levels of "understanding by challenging them to invent and explore movement, to learn the challenges of the specifics of the movement vocabulary, and to express intention and action" (Davis, 1995, p. 33).

According to Joyce (1980) and Stinson (1988), one of the aims of creative dance is to challenge a child's intellect from the standpoint of the quantity as well as the quality of responses in movement expression. LMA is a classification system with a specific vocabulary of movements which is divided into four major sub-elements: body, space, effort, and shape (Groff, 1995). Once children experience this vocabulary of movement they may be more able to develop their own movement ideas (Davis, 1995).

Creativity: An Overview of the Theories

An important aspect of creative dance is its commitment to fostering creativity in physical expression (Drewe, 1996; Joyce, 1980). Creativity is important in the context of the present study because it is also arguably the process by which children generate

movement ideas and transform them into physical expression. Therefore, it should play a key role in children's ability to transform ideas into movement expression. In this section, we will review some approaches to creativity and how they contribute to the idea of *creative dance* – in particular to the idea that creativity can be seen as the element that serves the purpose of translating Thought Language into Body Language expressions. At the outset it should be mentioned that the approach taken in this study is an interdisciplinary one borrowing from all three of the viewpoints presented in this section.

In general, researchers are divided into those who view creativity as a trait which can be attributed to some individuals (as personality traits) (e.g., Guilford, 1967; Torrance, 1965; Torrance, 1988) and those who view creativity from a cognitive-interactive perspective (e.g., Feldman et al., 1994; Gardner, 1993) as a process involving, among other things, cognitive capacity, including all forms of "human capacity such as mathematical, musical, and spatial intelligence" (Feldman et al., 1994, p. 3). In addition, some researchers (e.g., Joyce, 1980) view creativity as a computational process (Boden, 1992; Johnson-Laird, 1988); one by which ideas are generated and computed by the mind.

The Trait-Product Approach to Creativity

The trait approach to creativity takes into account productivity and the quality of responses. It is concerned with the number of different responses rather than focusing on the cognitive process that underlies creative thinking as a cognitive capacity.

Guilford's psychometric approach to creativity stresses that one individual can be more creative than another based on the idea of "divergent thinking", which is viewed as

an intellectual trait (Guilford, 1967). The divergent thinking perspective posits that an individual's creativity can be measured based on his or her "creative" production. Guilford's work suggests that aspects of creative thinking such as flexibility, originality, and fluency can be measured in order to assess creativity. According to Guilford and Hoepfner (1971), flexibility can be seen as an ability that can be transformed through creative thinking experience. Thus, we can assume that creative traits – or at least flexibility – can change over time or change from situation to situation as a product of creative thinking experience.

Following Guilford's approach, Torrance (1988) elaborated on three tests that attempt to assess creativity in terms of divergent production in children through verbal, figural, and movement activities. These tests can be scored for creative thinking abilities according to fluency (total number of relevant responses), flexibility (number of different categories of relevant responses), originality (the statistical rarity of the responses), and elaboration (richness of details). One of Torrance's main tasks - Thinking Creatively in Action and Movement (Torrance, 1981) - was used in the present study and is discussed in more detail in Chapter 3.

Davis (1975) suggests that the creative person expresses their creativity based on "attitudes, motivations, interests, values, and other personality traits" (p. 77). Thus, the creative person's approach can be seen as an individual ability to think in different ways and to excel in their use of intelligence and personality traits in order to be "creative" (Taylor, 1988). This approach takes into account the relationship between creativity and

intelligence, since creativity as well as intelligence can be assessed by the person's ability to solve a problem.

The Cognitive-Interactive Approach to Creativity

The cognitive-interactive approach to creativity focuses on the processes and capacities within and surrounding the creative person. Gardner (1993) proposes three different levels at which creativity is fostered: individual, domain, and field. The individual level includes cognitive and social psychological aspects, personality, and motivation. The domain level is the body of knowledge about a particular topic or area. The field is the context in which this body of knowledge is studied and elaborated, including the person working with the domain. Overall, Gardner's framework stresses that there are multiple intelligences (i.e., different types of intelligences) and that each individual can be "creative" in a specific domain.

Another cognitive-interactive approach to creativity was put forth by Sternberg and Lubart (1996). The "confluence" theory of creativity stresses that creativity needs distinct yet interrelated resources: intellectual abilities, knowledge, styles of thinking, personality, motivation, and environment. Overall, a combination of both cognitive and personality aspects are involved in this approach.

Finally, another cognitive-interactive view of creativity is the one suggested by Ward, Finke, and Smith (1995). They propose the Geneplore model, which is a type of information-processing model that posits two main processing phases to creative thought: the generative phase and the exploratory phase. In the generative phase, the individual constructs mental representations that are seen as "preinventive structures". The

exploratory phase includes the number of mental processes that are involved in "creative invention, such as retrieval, association, synthesis, transformation, analytical transfer, and categorical reduction" (Sternberg & Lubart, 1996, p. 681). Thus, in the first phase of the model of creative thought the individual generates ideas, and in the second phase the individual explores the "creative possibilities of that idea" (Ward, et al., 1995, p. 13). In summary, the Geneplore model of creativity stresses that everyone has creative potential and that it is necessary to learn how to use basic mental processes to elaborate on new ideas. The model has given rise to tests during which participants are showed three parts of an object and asked to combine the parts to "produce a practical object or device." A score for "practicality and originality " is computed by the judges (Sternberg & Lubart, 1996, p. 682).

The Computational Approach to Creativity

Boden (1992) claims that "creativity" occurs when an idea is generated by a novel combination of familiar ideas or when new ideas are generated by an exploration of the mind's "conceptual space". In Boden's 1992 work, two perspectives to creativity are discussed. The first perspective discussed is the Combinational creativity, which involves the new combination of ideas (i.e., a combination that has not happened before) and ideas that are above our expectations. The second perspective discussed is the Non-Combinational creativity, which focuses on transforming and exploring the "conceptual spaces" in one's mind (i.e., mental processes that can be changed or modified according to one's styles of thinking). A conceptual space can be thought of as a generative system; "a set of rules that determine how ideas can be organized and generated" (Boden, 1992,

p. 214). According to Boden (1992), creativity can be seen as a "creative system" in which a mind or a machine relies on "internal maps of its own conceptual spaces" (p. 215). "Internal maps" can be seen as cognitive maps as mental representations of how things stand in relation to one another.

Another computational approach to creativity is the one put forth by Johnson-Laird (1988). He suggests that creativity is a computational process a generative process for creating ideas. The creative *products, or* outcomes, of this computational process have three characteristics. First, "they are novel for the individual who creates them" (p. 218). Second, "they reflect the individual's freedom of choice and accordingly are not constructed by rote or calculation, but by a non-deterministic process" (p. 218). Third, "the choice is made from among options that are specified by criteria" (p. 218). When taking into account that creativity is a *human cognitive capacity,* one should consider the global capacity that everyone has to learn, or, said in another way, to discover how to use a physical or intellectual ability in a particular way.

Creativity, Cognition, and Assessment

Given the theories of creativity discussed above, in what ways is creativity related to creative dance and the physical expression of concepts? Although the main purpose of this study is not to assess creativity in itself, aspects of creativity as developed by Guilford (1967) and Torrance (1981) will be employed as observational criteria. In this sense, experimental tasks involving physical expression of concepts require that children use their creative cognitive capacity to solve movement tasks in an "original", "flexible", and "fluent" manner (Guilford, 1967). Each task in the present study will challenge the

child subjects to look for new and different ways to move, and to come up with as many ways as possible for expressing a concept as a movement. Thus, creativity is seen as emerging through the variety and quality of movement responses to a task.

Defining creativity in this way implies that the approaches discussed above are complementary rather than being in conflict with each other. Although eclecticism has been criticized (Bouffard, 2000), each approach is important in that they all lend support to the assumptions underlying this study and each contributes to the understanding of the creative dance processes and "products." The trait-product approach contributes to the understanding of individual abilities as measured by psychometric tests based on divergent thinking criteria (originality, flexibility, and fluency). The cognitive-interactive approach contributes to the understanding of creativity as a cognitive process that involves the field, the individual, and the domain (Gardner, 1993). The computational approach contributes to the understanding of creativity as a "generative system" (Boden, 1992). Overall, the three approaches complement each other in the present study because they all contribute to the understanding of creative dance as measured by the physical expression (the "product") that is the outcome of a cognitive process and by the exposure that children have to a specific type of training namely, creative dance education.

Figure 2 depicts the interaction between the three approaches as assumed in the context of the present research. The figure represents the creative outcome as the result of (a) individual traits, as in Guilford's (1971) and Torrance's (1988) approaches, (b) a cognitive-interactive process (e.g., through education), as in Gardner's (1993) theory, and (c) a cognitive-computational process, as in Boden's (1992) and Johnson-Laird's (1988)

theories.

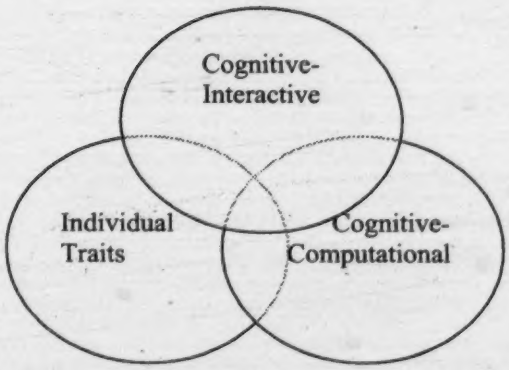

Figure 2. The intersection between three approaches to creativity. The creative "product" (e.g., movement expression) emerges from a combination of individual traits, and a cognitive-interactive process (e.g., education), as endowed by a cognitive-computational generative system.

We now turn to a brief discussion of some previous studies that employed similar observational criteria to the ones adopted in the present study. Then, in Chapter 3, we discuss in detail the method employed in the present study.

Some Related Studies

There have been very few attempts to empirically study the effect of creative dance programs on children's motor creativity, divergent thinking, and artistic abilities (Funk, 1996; Jay, 1991; Roseman, 1984; Wall, 1971). These studies employ similar observational criteria to the present study namely, Laban's and Guilford's frameworks.

However, there is no empirical study that investigates the physical expression of *concepts* through creative dance. Also, none of the studies discussed in this section focus on the possible cognitive benefits of creative dance to young children. Moreover, as we will see below, none of the studies find differences between children with a creative dance background and children without one.

Wall's (1971) research was based on Laban's framework. She investigated the effect of a creative dance program based on Laban's 16 movement themes (e.g., awareness of the body parts, spatial concepts, moving slowly and suddenly, etc.) by comparing the performance of two groups of children (control and experimental groups) on a painting task given before and after the treatment, which was a dance program. The experimental group received a dance program in one 20-minute session per week for twelve weeks, while the control group was kept in another room and motivated with stories to produce a painting. Both groups were pre- and post-tested. The tests were administered to 40 participants, all in the first grade. The final products (painting and collage) were assessed by six experts with backgrounds in areas such as art education, physical education, and developmental psychology. No difference was found between the two groups. Thus, the conclusion to be drawn here is that the creative dance program had no significant effect on the artwork of this particular group of children during the 12-week period.

Another study that focuses on the impact of a creative dance program on creativity is Roseman's (1984). He investigated the effect of creative dance on the divergent thinking of mildly retarded adolescents. The aim of the study was to compare a

program in creative movement with one in the fine arts (painting) to see their effects on the divergent thinking abilities of the adolescents. Roseman's rationale was that retarded individuals are deficient in "both their convergent and divergent modes of thinking" (p. 5). Thus, he states that creative dance is a "psychoeducational technique" through which mentally handicapped individuals can increase their divergent thinking. In Roseman's study, the participants were 20 mentally handicapped adolescents in Grade 9, eight students enrolled in the arts program, and 12 students enrolled in the creative movement program. The data for his study were collected using (a) interviews with the students participating in the creative movement program (b) Torrance Test of Creative Thinking (TTCT), (c) Thinking Creatively in Action and Movement Test (TCAM), and (d) two case studies (two handicapped children). The dance program took place a few times a week during a period of a semester. An interview with the students was also conducted in order to have verbal feedback from the participants.

The results showed no statistically significant differences between pre- and post-test scores on the TTCT for both groups. Since Roseman did not administer the TCAM before and after the treatments (creative dance and art programs), it is not possible to evaluate their effect regarding creativity in movement. However, the TCAM results showed no difference between the art and creative dance groups.

Funk (1996) developed a study that has methodological similarity to the present study. He investigated the effects of creative dance on movement creativity in sixteen Grade 3 children (between 8 and 9 years old). An experimental group received the treatment and a control group did not receive the treatment. The study focused on

quantifying general movement creativity and fluency in movement. The data were collected through judges' observations of children's individual performances on "self-generated movement questions". The movement tasks were recorded to videotape and were labeled based on dance elements present in the video. Pre- and post-tests were administered and results of both were computed. Once the data from the dance elements were combined, there were no significant changes in either the experimental or control group. Funk states that there was an increase in both groups, but that the changes in the results could not be attributed to the treatment. According to the author, one possible reason for this may be the nature of movement creativity and the test instrument used to evaluate it. However, the lack of significant results casts doubt on the effect of a creative dance program in developing creativity in young children.

Jay (1991) investigated the effect of a creative dance program in a group of language-delayed children ages 3-5. The children in Jay's study also had other handicaps such as motor, attention, and visual problems. She had two groups, one group of 12 children, which received a creative program for 12 weeks (30 minute lesions three times a week), and another group of five children who received an adapted physical education program for the same period. For both groups, Jay administered the TCAM before and after the program, collecting scores on Fluency, Imagination, and Originality. In Jay's creative dance classes, children explored Laban's effort elements (dab, flick, glide, float, press, wring, punch, and slash) combined with artistic activities designed to explore those elements (e.g., for the "glide" element, she asked children to "paint with a brush on the

line of circle"; she also gave the children images such as "like a train moves on a track", and also movement themes such as "birds, corn seed, leaves" (Jay, 1991, p. 310).

In Jay's study, children of the creative dance group showed significant improvement over the physical education group only in the Imagination criterion of the TCAM test. The results of both groups were similar in the Originality and Fluency criteria of the post-program TCAM. Unfortunately, Jay did not report the data of the pre-program TCAM, nor did she mentions whether or not the creative dance group improved its TCAM scores from pre- to post-test.

Several factors may have contributed Jay's lack of significant results in some of the TCAM criteria. One was the age of the group, 3- to 5 -year-olds. As Jay herself recognizes, the children she studied could in fact be considered in the 2- to -4 age range given their developmental delays. The number of children in the study and the unbalanced number of children in the groups (12 versus 5) may also have contributed to the result. A possible confound in Jay's study was that she developed and administered the creative dance program herself, while the physical education class was taught by another teacher. It is possible that children in the creative dance group performed better on the post-program TCAM because they were accustomed to the teacher, thus possibly less inhibited to perform the actions of the task than the physical education children. It is also important to note that since Jay did not have a group of healthy controls, one cannot take her results as supporting the thesis that a creative dance program may contribute to creativity.

As we have seen, none of the studies discussed above found evidence for the effect of a creative dance program in creative abilities of children. This casts doubts on the claimed effects of such a program. However, it is possible that the studies above failed to find effects due to some methodological problems or because they investigated special populations. The present study aims at further investigating the effect of creative dance by comparing different groups of healthy children with different backgrounds in dance (creative dance, ballet, and a control group with no dance background) and by employing a data collection procedure based on standardized tests (TCAM and the Test of Gross Motor Development, TGMD), and on an instrument developed to rate children's physical expression of movements based on Laban's movement elements and on Guilford's creativity criteria.

Two particular studies (O'Neil, 1982, and Gingras, 1986) were concerned with the development of instruments based on similar observational criteria as the ones used in the experimental study reported in the present thesis.

O'Neil's (1982) study aimed at investigating creativity in the context of children's dance by identifying the way children use the elements of movement and by assessing the relationship between refined movement analysis and some creativity measures. The purpose of O'Neil's study was twofold. First, she investigated creativity elements in the context of children's dance. She elaborated and refined an instrument to assess creative potential in movement, and used motor creativity aspects such as motor fluency and motor originality to develop a set of observational criteria for her instrument of investigation named "Refined Movement Analysis Category System" (RMACS).

Second, she looked at the relationship between the RMACS and a previous related instrument developed by Beveridge (1973), the Beveridge Motor Creativity Test (BMCT). The BMCT is a test to assess creative abilities in movement using creativity aspects of fluency and originality (Guilford, 1967) and Laban's system of the elements of movement (space, flow, shape, time, and weight) as measures of assessment. The BMCT addresses differences between groups in terms of high and low creativity. The elements of movement were used as possible indicators of individual differences in creative ability in children.

The participants in O'Neil's study were 26 randomly selected Grade 2 students from four schools. In her study, four movement problems were presented to children with a creative dance background. Each of the four movement problems was elaborated to assess some specific elements. Four expert judges observed and scored the children's performance in each of the four movement problems from videotapes. O'Neil found a significant correlation between the instrument she designed—the RMACS—and the instrument designed by Beveridge (1973)—the BMCT. More importantly, she found that among all elements of movement, "direction" (a subtype of the space element) was the greatest predictor of movement creativity.

Gingras' (1986) study also focused on developing and validating an instrument to investigate motor creativity also based on the combination of Guilford's (1967) and Laban's (1975) theories. Her instrument, Motor Fluency-Flexibility Test (MFFT) was also designed to assess motor creativity in the context of dance and was based on the RMACS (O'Neil, 1982).

Gingras used five movement elements (body action, body parts, time, level, and direction) and two creativity factors (Fluency and Flexibility) from Guilford (1967). Twenty-four Grade 2 students with experience in creative dance from their physical education classes were selected as participants. Responses to two movement tasks were videotaped and scored on Fluency and Flexibility criteria by three observers (dance experts). In her study, the two instruments of measurement of motor creativity (RMACS and MFFT) were administered to all participants and then compared for possible correlation and validity between the RMAC and the MFFT. The author mentions a "satisfactory" content validity for both instruments in measuring creativity in movement. She states that the MFFT represents a valid, reliable, and objective means of assessing motor creativity.

The above summaries are provided as background supporting our assumption regarding the combined observational criteria employed in the current study (Guilford's indicators of creativity and Laban's Movement Analysis). For instance, the empirical question addressed in the present study and those addressed by Gingras (1986) and O'Neil (1982) are very distinct in nature. Gingras and O'Neil relied on the usefulness of Guilford's and Laban's approaches to inferring and assessing motor creativity in dance. The present study relies on Guilford's and Laban's frameworks to observe children's physical expression of concepts, though not their creativity per se.

Some of the studies under consideration (Jay, 1991; Roseman, 1984) employed standardized tests such as TTCT and TCAM (Torrance, 1981) and were also based on Laban's framework. These authors investigated motor creativity through the development

and refinement of motor creativity instruments in relation to a dance program for young children. However, the purpose of the present study is to investigate the physical expression of concepts as a function of different movement experience in children between 6 and 7 years old, thus examining the hypothesis that children with creative dance background will perform better on tasks involving physical expression of concepts because the children with such a background may have fostered the "translation" mechanism between Thought Language and Body Language. By the same reasoning, the second hypothesis being tested is that children who have not fostered this mechanism will have more difficulty expressing concepts physically.

CHAPTER 3: METHOD

Two standardized tests and an experimental task were administered in the following order. First, the Test of Gross Motor Development (TGMD, 1985) and Torrance's Test of Thinking Creatively in Action and Movement (TCAM, 1981) were administered to the participants. Second, the experimental task was administered (Table 1).

The administration of the two standardized tests was important for screening and collecting information about the participants' backgrounds in a quasi-experimental study where intact groups were used (Creative Dance, Ballet, and No Dance backgrounds). The two tests seemed appropriate for the purpose of this study because they provide information about basic locomotor skills (TGMD) and children's creative thinking abilities in movement (TCAM). The tests were administered to check the assumption that the three groups were equivalent in regard to their motor development and general creative abilities. The TGMD was administered by a physical educator and the TCAM by a dance teacher. In addition to the two standardized tests, an experimental task was administered. During the experimental task, children physically expressed abstract and concrete concepts that were presented to them. The experimental task, developed by the investigator, was designed to test 6- and 7- year-old children. Participants from two dance backgrounds were recruited for this study together with a control group, which had no dance experience. Measurement of children's performance on the experimental task was done using a rating questionnaire also developed by the investigator.

Table 1

Summary of Method

Participant Recruitment		
Group	Place of Recruitment	Method of Recruitment
Ballet	7 Edmonton Ballet Schools	Flyer distributed to parents
Creative Dance	2 Edmonton Creative Dance programs	Flyer distributed to parents
No Dance	5 Edmonton Public Schools	Flyer distributed to parents

Data Collection		
Phase	Test administered	Purpose
Pre-testing	TGMD	Test motor development
	TCAM	Test creativity in movement
Testing	Experiment	Test physical expression of concepts

Coding and analyses		
Test	Method	Data
TGMD	Ratings provided by two physical educators	Standardized scores on gross motor development
TCAM	Ratings provided by two dance educators	Standardized scores on movement creativity
Experiment	Ratings provided by five dance educators	Scores for physical expression of concrete and abstract concepts

Participants

Thirty-five children (8 males; 27 females; aged between 6- and 7-year-old) participated in this study. The pool of participants was selected from several schools in the Edmonton area (see Appendix A). According to the background questionnaire administered to the participants, none of the males had ballet or creative dance backgrounds. Hence, they all belonged to the no dance group.

All children participated as unpaid volunteers and received a certificate in recognition of their participation. Children's background information was collected from a questionnaire distributed to the parents during the recruiting phase (see Appendix B). The thirty-five participants were pre-classified according to the schools and programs they were attending at the time of the recruitment (see Appendix C). Ten of the children were pre-classified as participants of the Ballet group, 13 children as participants of the Creative Dance group, and 12 children as participants of the no dance group. However, upon completion of the consent forms (see Appendix D) and the information questionnaire, and just before the children participated in the tasks, it became known that some children did in fact have experience in creative dance or ballet although they were pre-classified as participants of the no dance group. Other children who were pre-classified as participants of the Creative Dance group in fact had more experience with ballet or other formal dance training (e.g., Ukranian dance) and, as such, were classified (post-hoc) as participants of the Ballet group. The discrepancy between pre- and post-classification, thus, were due to the mismatch of information provided by the parents at the time of recruitment and at the time of the study. The criterion used to classify

participants as belonging to one group or another was a minimum of six months of dance training (either in ballet, folk, or tap). Thus, the children who had formal dance experience were post-classified as participants of the Ballet group. According to the post-classification criterion, there were: 11 children in the Ballet group, 12 children in the Creative Dance group, and 12 children in the no dance group (Table 2). All participants were attending Grade 1 at the time of the study (except for two children who were 5 years and 11 months old and were not in Grade 1 yet). This new classification was taken into account in all the analyses reported in the next chapter.

Table 2

Children's Age and Training Experience.

	Group		
	Creative Dance (n=12)	Ballet (n=11)	No Dance (n=12)
Mean age (years)	6.5	6.10	6.8
Training experience (range)	8 mo - 3 y	6 mo - 3 y	0

Five expert judges volunteered to participate in this study. Four were from Montreal and were affiliated with dance schools at McGill and Concordia Universities.

One expert was from Edmonton (University of Alberta). The judges were experts in the dance education area with broad experience in the following dance techniques: modern dance, ballet, creative dance, folk dance, jazz, and tap. Most of the judges held a B.F.A. or M.A. in Dance or Physical Education or were close to the end of their degrees in their respective areas. Their mean number of years of dance studies was 18 (*SD*=6.9). On average, the judges had 17.4 (*SD*=11) years of experience in teaching dance to young children. All judges had experience in teaching creative dance to young children, among the other dance techniques. All judges taught dance to children in public schools, private dance schools, conservatories, and university settings.

A description of the method used in each task follows.

Standardized Tests

Test of Gross Motor Development (TGMD)

The Test of Gross Motor Development has several purposes, according to Ulrich (1985). The first was to design a test based on the frequency of the content of physical activities taught to children in pre and elementary schools (3- 10 years of age), including children with special needs (Ulrich 1985, p. 2). The second purpose was to elaborate a test that could be used by different types of teachers and that did not require a lot of training and preparation. The third purpose was to create a test with "norm - and criterion-referenced interpretations" (p. 2). The final purpose was to focus on the motor skill itself instead of the outcome of the performance.

The TGMD was administered in the present study to determine whether the participants' gross motor skill development was similar across groups. The scoring of the

test followed the standard procedures presented in the test manual. The locomotor skill scale of the TGMD is based on seven skills (run, gallop, hop, leap, jump, skip, and slide). For scoring purposes, each skill is broken down into three or four critical features. After instructions and a demonstration, each child is asked to perform a given skill three times. When a critical feature is observed on two trials out of three, a score of 1 is given for this feature. Otherwise, a score of 0 is given. The total locomotor scale score (max = 26) is formed by adding all of the critical-feature scores. From the total score, the test administrator computes the percentiles and the standard scores according to Tables A and B in the test manual (see Appendix E).

Reliability and Validity

The TGMD has been reported as having a "high degree of reliability, or a good match between observed and true scores, for the three types of composite scores in the TGMD" (Burton & Miller, 1998, p. 234). The reliability of the test is based on two criteria. One is the norm-referenced perspective and the other is criterion-referenced interpretation. The norm-referenced criterion is based on the "stability, inter-scorer, internal consistency, and the standard error of measurement" (Ulrich, 1985, p. 27).

The content validity of the TGMD was established based on three content experts who judged the appropriateness of the skills that are frequently taught to preschool and elementary school children. The construct validity of the TGMD relies on the assumption that the skills tests reflect basic gross motor skills. Thus, the construct validity of the test emphasizes two hypotheses. First, analysis reported in the manual shows that the tests

are "highly related" and hence given "support to construct validity of the instrument" (Ulrich, 1985, p. 31). Second, the gross motor development scores improved significantly across age levels.

Task and Administration Procedure

The TGMD was administered in a physical education gymnasium measuring 210 m^2. The gym area was divided so that two thirds of the space was reserved for the TGMD administration and one third was reserved for the TCAM administration. Figure 3 shows the layout of the gym at the time of testing. In front of each test area there was a Panasonic PV 950 two-speed zoom video camera placed on a tripod.

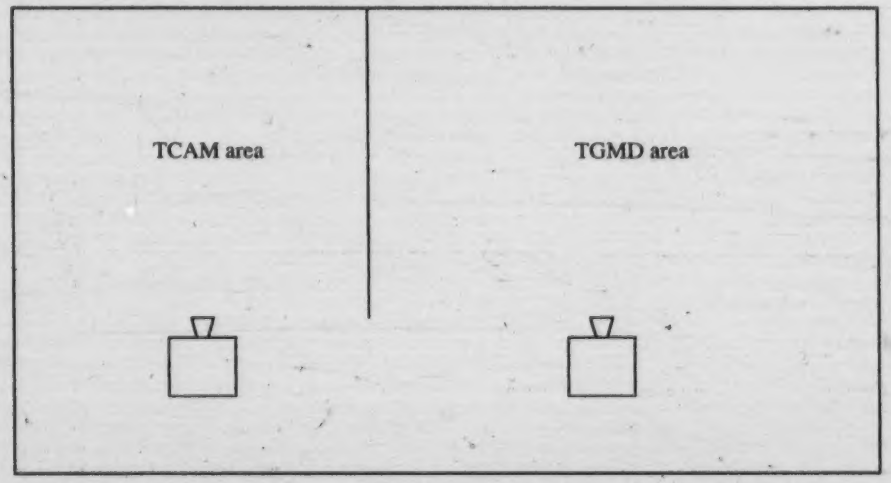

Figure 3. Layout of the gym where the TGMD and the TCAM tests were conducted.

The materials used during the TGMD administration were written signs with the name of each locomotor skill, cones (to mark the floor for each skill), scoring booklets, and a video camera to record the children's performance on videotape.

Each child performed the TGMD individually. Children were wearing shorts and

t-shirts with number tags. There were no indicators identifying the group to which each child belonged. The order in which each child performed the task was in accordance with each child's availability, as determined by a sign-up procedure in which their parents chose an hour-long slot. Once the child was brought to the gym, the test administrator introduced herself and provided a relaxing and enthusiastic atmosphere for the child. Each skill was demonstrated one time by the administrator and then performed three times by the children. The second and third trials were selected for scoring. The total time for the test administration was approximately twelve minutes.

Scoring and Coding

The two judges received a scoring booklet to rate each of the thirty-five participants. The scoring booklet contains a list of seven locomotor skills (see Appendix E). For each skill, it specifies the equipment needed (e.g., for the run skill, "50 feet of clear space, colored tape, chalk or other marking device"), the directions for how to set up the space and what type of instructions are to be given to the child (e.g., for the run skill, "mark off two lines 50 feet apart; instruct student to 'run fast' from one line to the other"), and the performance criteria under which the child's performance should be rated. Each skill had its own set of three or four critical features.

The raw data for the analyses were the scores obtained by each child on each skill as given by the two judges. For the purposes of rating, the judges were given videotapes, test manuals, and scoring booklets with instructions on how to observe and score the children's performances on each of the seven locomotor skills (see Appendix E). The two judges were graduate students in physical education at the University of Alberta. One

of them was the investigator. Both judges followed written instructions on how to score the TGMD using the test manual and received videotapes with the thirty-five participants performing each of the seven skills individually.

After each skill was performed three times, the judge gave a score of 1 when the critical feature was observed two out of the three times, or a score of 0 if the criterion was not met. Hence, for each skill, the maximum possible score was 3 or 4, depending on the skill. The total scale score was obtained by adding the scores for each skill. For the purposes of this study, the total score was defined as the average of the total score of both judges.

Torrance's Test of Thinking Creatively in Action and Movement (TCAM)

The TCAM is a test of creative thinking abilities designed to be administered individually to children between three and eight years old. The TCAM was used in the present study to ensure that all participants were at about the same level of creative abilities. The participants were the same ones that participated in the TGMD test mentioned above.

The purpose of the TCAM is to measure creative abilities in children's movement. It takes into account kinesthetic expression represented by a child's ability to find solutions to a given problem. Verbal responses are not required but can be acceptable when provided along with movement. TCAM assesses creativity according to three general criteria: Originality, Imagination, and Fluency, which follow from Torrance's (1981) theory, as discussed in Chapter 2. The test consists of four movement activities; "How many ways?", "Can you move like?", "What other ways?", and "What

might it be?", which are scored according to the three criteria mentioned above (see Appendix F for sample TCAM materials).

The scoring guide indicates that an inter-scorer reliability was computed for TCAM: "a preliminary study of the test-retest reliability yielded satisfactory results with a sample of twenty children (three to five years of age) tested two weeks apart" (Torrance, 1981, p. 7). The test manual indicates that an overall test-retest reliability correlation coefficient of .84 was obtained, with smaller but still high correlations in particular activities (Activity 1=.71; Activity 2=.79; Activity 3=.67; Activity 4 =.58). It also reports that "with a sample of fifty records, the author and a research assistant obtained reliability coefficients of .99 for Fluency: and .98 for Originality and no significant differences in means" (Torrance, 1981, p. 6).

Evidence supporting the construct validity of the test has been "advancing slowly" (Keyser & Sweetland, 1992, p. 505). According to Keyser and Sweetland, the test seems to require more construct validation evidence. In particular, longitudinal research that presents more evidence for "young children's kinesthetic expressiveness and their later creative achievement" is needed (Keyser & Sweetland, 1992, p. 505).

Task and Procedure

A testing area measuring approximately 90 m^2 was prepared for the administration of this task. Placed in front of the area was a Panasonic PV 950 two-speed zoom video camera that was used to videotape the children's performances on the four activities of the TCAM (see Figure 3).

The space for the test was delimited – from starting point to stopping point – by the test administrator with the use of strips of colored tape. The materials used in the test administration were the instructions booklet, scoring sheets, pencils, a wastebasket (for one of the activities – "What other ways?"), and a supply of paper cups (for two activities, "What other ways?" and "What might it be?").

The test was scheduled to be administered right after the TGMD, so that each child who finished participating in the TGMD moved from one area of the gym to another in order to participate in the TCAM. First, the test administrator introduced herself and provided a comfortable environment for the child. The test administrator was familiar with the test instructions and spontaneously communicated with the children. According to the TCAM instructions manual, no special training is required of the administrator, although basic skills such as having a good rapport with the children, being able to model the tasks appropriately, and having clarity of communication are all recommended. After an introduction, the test administrator explained the task and then asked the child to perform it.

The entire test (four activities) took approximately fifteen minutes per child. The test administrator recorded in the test booklet the type of movement responses the child came up with. No specific time frame was established for each activity. However, the time that each child took to complete each activity was recorded in the test booklet (approximately four to five minutes). The child decided for how long he or she wanted to move and, once the child was done with the movement choices, the child could stop

performing the activities. For instance, in Activity 1, "How many ways?", the child could perform as many different ways as they could think of without any time constraints.

Materials and Design

The test administrator received the 35 scoring booklets and pencils to administer the test according to the activities presented in the test booklet. They also received written instructions for the test administration. Other materials were provided to the administrator, such as a wastebasket and paper cups, to be used in some of the activities. The space for the child to move was also marked in advance and the video camera was set up.

In each scoring booklet, there were four activities to be performed, and each one was scored according to one or more of the creativity criteria (see Appendix F). One activity was scored by the test administrator during the time of the test. The other activities were scored right after the conclusion of the test by the test administrator and the investigator. The scoring procedure is described below.

Coding and Data Analyses

The test administrator (DR) was a dance teacher with more than fifteen years of experience teaching dance to children. The investigator (AdA) also has extensive experience teaching dance. As the judges, they were both familiar with the test instructions and the scoring procedure (see Appendix F).

The videotapes of the TCAM were used for the scoring of Activities 1, 2, 3, and 4 by the two judges according to the test-scoring guide. DR scored the test right after each child's participation while AdA scored it at a later date through the observation of the

videotapes. In order for a standard score to be given to each child, raw scores were matched to a table of age-appropriate scores according to an Originality weight, following standardized responses (see Appendix F). A list of responses and the scores for each participant followed the standardized norms presented in the TCAM manual.

The scoring procedure was as follows: Activity 1 ("How many ways?") was scored by simply counting the number of ways a given task was performed. Activity 2 ("Can you move like?") was rated on a five-point scale for only one criterion (imagination) as opposed to the other three activities, which were scored for Fluency and Originality criteria. The other three activities were scored according to the administrator's written records of all movements performed by the child in each activity. The scores for Activities 1, 3, and 4 were classified according to the test norm list. Thus, depending on the type of movement response that the child gave, they got 0, 1, or 2 points for each response. If the child's movement responses were not in the norm list, then this child would get 3 points for uniqueness. For each activity, a total/raw score was computed and then this score was classified according to the norms published in the manual (see Torrance, 1981, p. 27) for 6- year- olds or according to the calculated norms for 7- year-olds. The calculated values were based on published means and standard deviations for 7-year-olds.

For the data analyses, first the inter-judge reliability was analyzed with a Pearson-product-moment correlation test. Then, inferential analyses were carried out based on the raw scores and on the standardized scores. For these analyses, three one-way ANOVAs for independent samples were conducted on each dependent variable (Fluency,

Originality, Imagination).

A detailed account of the variables used in these analyses is presented in Chapter 4.

Experimental Task: The Physical Expression of Concepts

The movement task reported in this section was designed to test children's ability to physically express concepts (abstract and concrete). Four words were pre-assigned to each child. First, the test administrator explained the type of movement and word game to the child. Second, when the child understood the task, the four words were presented one by one to each child individually. No time limit was established for the completion of the task. Five expert judges with experience teaching dance to young children volunteered to observe the children's performances on videotape. A rating questionnaire was developed by the investigator to gather the judges' assessments. The method and procedure used for this part of the study is described below.

The study consisted of two phases. In the first phase, children were videotaped performing the experimental tasks. In the second phase, expert judges observed the videotape and rated the children's performances based on a rating questionnaire developed by the investigator.

Phase I: Data Collection

Task and Procedure

The study was conducted in a dance studio at the University of Alberta. The children wore number tags (numbers 1 to 35), which were assigned by a research assistant, and their group membership was not disclosed to the task administrator (the

investigator) or to the judges who rated the children's performances during Phase II of the study. The study was scheduled for three days in order to accommodate the large number of children. The parents could consequently choose a day and time that was convenient for them to bring their children in for the tests.

In order to recruit participants, a letter with information about the study and a consent form requesting parental permission (see Appendix D) was sent to the children's homes by their school administrators.

The consent form for each child was checked at the time of their arrival by a research assistant. In a waiting area, children received a number to be attached to their t-shirts prior to the tests. It was previously arranged through the consent form sent to the parents that the children should wear a t-shirt, shorts, and sneakers for the two standardized tests, and bare feet for the experimental task. This was done in order to avoid clothing that could reveal their group membership (e.g., leotard, ballet shoes, etc.).

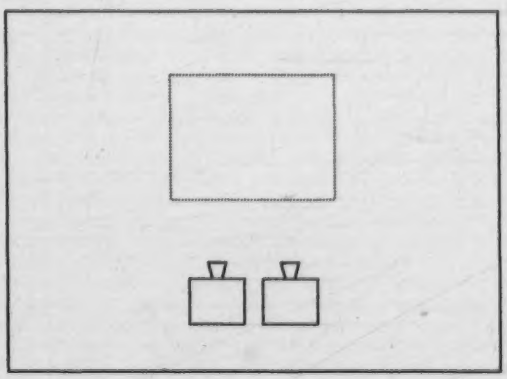

Figure 4. Layout of the dance studio where the experimental study was conducted. The dashed rectangle represents a 12 m^2 area where the children performed the tasks. Two cameras were used to video-tape the children's performances.

The experimental area for the tasks was set up in a dance studio. The area measured 3 m x 4 m. Red tape was used to mark the rectangle inside of which each child was asked to perform the tasks. The marked area was big enough for the child to move within it and be observed on videotape during Phase II. Two Panasonic PV 950 two-speed zoom video cameras on tripods were placed in front of the experimental area. Both cameras were set up to record from the same viewpoint (see Figure 4).

The delimitation of the space helped to facilitate the videotaping with the stationary cameras and provided sufficient space for the children to move. Two videotapes were recorded at the time of the study; one recording directly through a camera attached to a monitor and a VCR. Also, a TV monitor and a VCR were placed in front of the marked area and connected to the video camera so that the picture displayed on the camera was the same one being displayed on the monitor. The front of the monitor was facing the investigator, in order to avoid the children being distracted by their own images. The recording of the two tapes at the same time was for two reasons. First, one camera was used to produce the videotapes which were to be given to the judges; the other was to serve as a backup.

Each child was brought to the dance studio by a research assistant after participating in the TGMD and TCAM tests. Once in the dance studio, the child was greeted by the investigator. The investigator introduced herself and asked the child to

remove their shoes and socks. The child was directed to the center of the marked area (see Figure 4). Then, the child was asked to stand up and hold on to a piece of paper with the same label number as the one they were wearing. This procedure facilitated the judges' observations later on, since each child was identified only by the label number. This was also done to mark the beginning of each child's participation and therefore make the editing of the videotapes easier. In order to rate the child's performance on the tasks, it was important to ensure that the judges were able to see each child's number on the videotape.

After the initial procedure, the investigator started a conversation with the child explaining that they would be playing a "Movement and Word" game (see Task Script on Appendix G).

Thereafter, the experimental tasks unfolded as follows. Each child was presented with four words (two concrete concepts and two abstract concepts), which were previously assigned to the children. The order of presentation was as follows: One pair of concrete concepts followed by one pair of abstract concepts. This order was reversed for every other child (see Appendix H). This procedure was adopted to avoid any order effect. Each of the four words corresponded to one part of the experimental task.

For every word, children were given the following instructions: "Show me with your body movements whatever comes to your mind when I say the word _____". A pre-assigned word would be given to the child (see Appendix H for a list of paired words used in this study). Also, a cue card for each word verbally presented to the child was presented in front of the camera so that the judges would be able to see the word as well.

The instructions for the experimental task were repeated by the investigator previous to the presentation of each of the four words. As mentioned above, the explanation and the rules for the "Movement and Word" game were presented to the child at the beginning of the experimental section. Most of the children immediately reacted to the word presented and started to move once they were given the task instruction. When the child did not understand a word, another word from the same category (abstract or concrete) was presented.

During the child's physical expression of ideas (words), a few prompts were used in order to guide and motivate the child (see below). Before the task introduction, each child was told that they could move for as long as they wanted to and that it was up to them to decide when to stop. Thus, no time limit was established for the tasks. Once the child stopped moving, the investigator asked the child some of the following prompts:

-"Can you think of anything else?"

-"Please, could you try a different way?"

-"Is there anything else you would like to show me about the word _____?"

- "Are you done?"

Once children finished the task, the investigator gave them each a sticker as a reward for their participation. On average, each child took approximately 12 minutes to perform the four words. Each child was then brought by the research assistant to another room for the next phase of the study (the interview). The purpose of the interview phase, which consisted of the child's own commentaries on their performance as they watched

the videotape, was to collect data on how the children perceived their own movement expressions. This phase is not part of the present thesis.

Materials and Design

Initially, 24 concrete and 24 abstract concepts were selected and previously assigned to ensure that one child from each group would get a given set of four words, each word corresponding to one movement task (see Appendix H).

Twenty-four concrete concepts (from the category "animal" - e.g., LION) and 24 abstract concepts (from the category "feelings" - e.g., HAPPY) were initially selected for the experimental tasks. In order to select the most appropriate concepts, words that designate the concepts were balanced (i.e., normalized) for familiarity, concreteness (abstract and concrete), and imageability, following the norms collected in the *Handbook of Semantic Word Norms* (Toglia & Battig, 1978). Also, frequency norms were selected from the MRC Psycholinguistic Database (Coltheart, 1981). These norms were used to ensure that the words were age-appropriate, equally frequent, and representative of concrete and abstract concepts. Four words were previously assigned to each child. Each child was presented with two concrete and two abstract words. Initially, based on the movement background of each child, the concrete and abstract words were distributed equally across groups. One child from each group would get the same set of four words. For instance, Child #1 (Creative Dance group), Child #11 (Ballet group), and Child #21 (no dance control group) were going to be presented with the same four concepts (HORSE, LIZARD, HAPPY, ASHAMED). The distribution was determined prior to the running of the study (see Appendix H). However, some children did not show up at the

time of the data collection. For this reason, the groups became unbalanced and the distribution of the sets of words was in fact not balanced across groups. The investigator received the list of previously assigned numbers and concepts without knowledge of the movement background of each child.

The distribution of concepts across groups was determined by taking into account the movement background of each child as informed by their parents during the recruitment phase. Because of disparities in the pre- and post-test classifications, the words assigned to the groups beforehand turned out to not be balanced across groups. This problem caused some repetition of concepts within groups. In the end, the numbers of unique concepts to each group was as follows: The ballet group was presented with 22 concrete words and 22 abstract words. The no dance group was presented with 24 concrete words and 24 abstract words. The creative dance group was presented with 24 concrete and 24 abstract words.

Phase II: Coding and Data Analysis

The edited videotapes produced in Phase I were given to judges together with rating booklets and instructions on how to observe and rate the children's performances on tasks involving physical expression of concepts.

Instrument: Rating questionnaire

For this phase, a rating questionnaire was developed by the investigator (see Appendix I). It consisted of eleven questions. One question was about the Fluency criterion, five questions were about the Flexibility criterion, and the other five questions were about the Originality criterion (all criteria based on Guilford & Hoepfner, 1971).

Within each criterion, the use of the elements of movement were incorporated and rated according to the child's expression. Only the question regarding fluency of movements was scored in a different way: by counting the number of movement ideas expressed by the child for each word presented. The remaining 10 questions in the questionnaire followed a rating scale from 1 (no response) to 5 (excellent).

Besides the rating booklet, two other booklets were developed, one in order to obtain information about each judge's background (see Appendix J) and one with detailed instructions on how to rate the children's performances (see Appendix K).

The content validity of the rating questionnaire was established by two university professors and experts in creative dance. The rating questionnaire was revised, and feedback was provided by the two experts. Thus, the suggestions made were incorporated and a pilot study was run to test the instrument. The pilot study allowed for practice with the structure and logistics of the experimental task. At a date prior to the experimental study, three young children were tested by the experimenter and the administrators of the TGMD and TCAM on all three main tests of the study (TGMD, TCAM, and the experimental task). This was also an opportunity for the test administrators to become trained in the procedures to be employed at the time of testing.

The reliability of the data was established by inter-judge agreement between the five teachers and experts in creative dance who observed the videotapes and scored the booklets.

Materials and Procedure

The materials used in this phase of the study were the booklets and the videotapes recorded during children's performances of the tasks.

The original videotapes (the ones recorded at the time of the study) were used to edit into a master copy so that the children appeared in sequential order - from Child 1 to Child 35. The master copy served to produce five different copies, each with the children in a different order; one for each one of the judges. This randomization was to avoid any effects introduced by the practice that the investigator gained while administering the tasks and also to avoid order effects on the part of the observers.

The three booklets distributed to the observers consisted of: (1) the instructions on how to rate the questionnaire, (2) an information sheet that served to gather information about the judges' academic backgrounds and teaching experience, and (3) the Rating Questionnaire. Thirty-five copies of the rating booklets were produced for each judge (one rating booklet per child), with each booklet containing four words to be rated (see Appendix I).

Rating schemes were developed according to Guilford's (1967) creativity criteria and Laban's (1975) elements of movement. Both frameworks were combined and rating questions were formulated on a scale from 1 (no response) to 5 (excellent).

The five dance elements were selected for this study based on Laban's theory (1975). Laban's approach offers a solid theoretical framework through which to observe and understand movement based on effort qualities. His definitions and classifications of movement were adapted to fit the purpose of this study.

The rating booklet consisted of ten items which were divided between Flexibility and Originality criteria within the dance elements (see Appendix I) and one item referring to the Fluency criterion. Five rating items were derived for each of the Flexibility and Originality aspects based on the dance elements (space, flow, shape, time, and weight). In other words, each aspect of creativity was rated in relation to each one of the five dance elements.

Guilford's aspects of creativity - fluency, flexibility and originality - were the main observational criteria. The Fluency criterion was evaluated with one question. Fluency of movement responses was scored by *counting the number of responses for each word.* For this criterion the judges were asked to indicate the number of movements or gestures produced by the child for each of the four word tasks. Besides the 10 rating questions, space was provided on the booklet so that the judges could add their comments and justifications regarding the tasks and the child's performance. The Flexibility criterion was assessed in the following way: children were asked to physically express a concept *by different changes in thinking reflected in different changes in movement responses*. This criterion was evaluated within each of the five dance elements (space, flow, shape, time, and weight) and Guilford's definition of flexibility. According to this criterion, the judges were asked to look for different changes in movement as the child expressed each of the four word tasks. The definitions of the measures for each rating question are stated below (for more detailed information on these criteria and the rating questionnaire, see Appendix I). Flexibility in the use of shape was measured based on different changes in movement varying the use of movement effort and qualities such as

wide, long, round, and twisted symmetrical or asymmetrical shapes. This criterion was also evaluated within each of the five dance elements (space, flow, shape, time, and weight) and Guilford's definition of flexibility. Flexibility in the use of space was measured according to the use of space level, pathways, and directions. A range *of different changes in movement in the use of space* levels is taken into account here (e.g., with changes from "out" to "in" movements). As an example of this type of movement criterion, we can see what Preston-Dunlop (1980, p. 23) offers as a type of in-to-out changes: "Stretching out, with focus far away becomes extending into space. Bending in, with focus near, becomes contracting into space". This example illustrates one of the possible variations within the use of space. Flexibility in the use of time was measured based on *different changes in movement in the use of time* (i.e., ranging from slow to fast, from constant to changing, from gradual to sudden movements). A movement can take a long or short amount of time to be executed. This is the movement's duration. The duration of the movement indicates the speed. It can increase or decrease the speed. Thus, the movement quality can be sudden or sustained. Flexibility in the use of flow was measured based on the *different changes in movement flow* (i.e., free to bound). Free flow is also known as uncontrolled, continuous, or on-going movement. Laban (1975) describes it as action that is difficult to stop. Bound flow is known as controllable, restrained, or cautious movement, described as the movement that can be held without difficulty at any time. "In an action in which it is difficult to stop the movement suddenly, the flow is *free* or *fluent*" (Laban, 1975, p. 56). "In an action capable of being stopped and held without difficulty, at any moment during the movement, the flow is *bound*"

(Laban, 1975, p. 56). Flexibility in the use of weight was assessed by *different changes in movement* in the use of weight (i.e., ranging from heavy to light). Most of the time movements have a weight quality. Some movements are stronger or heavier than others and require more muscular effort. Other movements are light or delicate and do not require a lot of muscular power. In fact, they have the feeling of weightlessness and freedom associated with them. The Originality criterion was measured according to one's ability to produce new, unique, unusual, or unfamiliar responses to solve a movement task. For this criterion, the judges were asked to look for unusual changes in movement as the child performed each of the four word tasks. Also, Originality was measured within each of the five dance elements (space, flow, shape, time, and weight). Originality in the use of shape was measured based on the degree of *unusual changes in the use of wide, long, round, or twisted symmetrical or asymmetrical shapes*. Originality in the use of space was measured based on the degree of unusual changes in the use of space (i.e., the range of *unusual changes in the use of levels, pathways, and directions)*. Originality in the use of time was measured based on the degree of unusual changes in the use of time (i.e., the range of *unusual changes from fast to slow tempo)*. Originality in the use of flow was measured based on the degree of unusual changes in the use of flow (i.e. the range of *unusual changes from free to bound* movement). Originality in the use of weight was measured based on the degree of *unusual changes in the use of heavy and light movements*.

All five judges were instructed to do a practice trial to get familiarized with the rating questionnaire before proceeding with the actual ratings. The judges were told that

approximately two hours would be necessary to practice and to familiarize themselves with the rating system. The investigator delivered the general instructions verbally to each judge, along with written instructions on how to do the rating (Appendix K). Also, a list of words corresponding to each child's movement task and a video-tape with the 35 participants in a randomized order were given to each judge. The judges were not told the nature of the study and were not given information about the three groups or about the background of each child.

The judges were told that the actual rating process (observation of the tape and scoring) would take approximately eight to 10 hours of volunteer work.

The scoring procedure was as follows. The judges rated the Flexibility and the Originality criteria on a scale from 1 (no response) to 5 (excellent). There were five rating questions for each criterion. The Fluency criterion was scored differently. This criterion was computed based on the quantity of movement expressed by each child (i.e., every gesture and movement). A total number of scores for Flexibility and Originality were taken into account for the purpose of analysis. A total final score was computed for Fluency of movement.

Data Analyses

All analyses were based on the raw scores produced by each judge for each task performed by each child. Inter-judge reliability was verified by correlation analysis. The analyses of the scores were done using analyses of variance (ANOVA). A detailed account of these analyses and a discussion of the main results of the three tests employed in the present study are presented in Chapter 4.

CHAPTER 4: RESULTS AND DISCUSSION

In this chapter the results of the TGMD, TCAM, and the experimental task are presented. A discussion of the main results of the study is included.

TGMD

The raw data for the inter-judge reliability analysis was the total score of each child as produced by each judge. The Pearson-product-moment correlation coefficient between the raw scores of Judge 1 ($M = 17.2$, $SD = 3.01$) and Judge 2 ($M = 16.7$, $SD = 3.46$) was high ($r = .94$). Given this high correlation, the average of the two judges' scores was used to present descriptive statistics and the conduct of inferential analyses. The mean raw score of each child was transformed into a standard score based on normative data as provided by the TGMD scoring manual. Mean TGMD standard scores and standard deviations for each of the three groups are shown in Table 3 (see Appendix L for TGMD raw scores and standard scores).

Table 3

Mean Standard Scores for the Three Groups of Children in the Test of Gross Motor Development

	Standard Score		n
Group	Mean	SD	
Ballet	9.1	1.5	11
Creative Dance	7.5	2.8	12
No Dance	7.2	2.0	12

The TGMD standard scores were analyzed with a one-way ANOVA with Group as the between-subject factor. The analysis showed no statistically significant difference between the three groups, $F(2, 32) = 2.46$, $p = .10$.

TCAM

The two judges were given videotapes, a test manual, and scoring booklets with instructions on how to observe and score each child's creative abilities on the four TCAM activities. Each judge's raw scores were transformed into standard scores by using the norms provided in the TCAM manual (see Appendix M). The inter-judge reliability was calculated using a Pearson product-moment correlation coefficient for each of the three creativity criterion scores. The scores of both judges were positively correlated for all three criteria: Fluency ($r = 0.996$; Judge 1, $M = 87.6$, $SD = 15.5$; Judge 2, $M = 87.3$, $SD = 15.4$), Originality ($r = 0.985$; Judge 1, $M = 89.4$, $SD = 15.3$; Judge 2, $M = 91.2$, $SD = 15.6$), and imagination ($r = 0.904$; Judge 1, $M = 87$, $SD = 11.5$; Judge 2, $M = 84.4$, $SD =$

12.5). For descriptive and inferential purposes the average of the judges' scores was computed for each creativity criterion. Three one-way ANOVAs were run on each dependent variable. For the imagination criterion, there was no significant difference among the groups, $F(2, 32) = 0.6$, $p = .59$; Ballet: $M = 84.6$, $SD = 11.9$; Creative Dance: $M = 83.6$, $SD = 10.3$; No Dance: $M = 88.5$, $SD = 13.2$). For the Fluency criterion, there was also no difference among the three groups, $F(2, 32) = 0.27$, $p = .76$; Ballet: $M = 86$, $SD = 19.9$; Creative Dance: $M = 86.1$, $SD = .6$; No Dance: $M = 90.2$, $SD = 16.6$). There was also no statistically significant difference among groups for the Originality criterion, $F(2, 32) = 0.71$, $p = .50$; Ballet: $M = 92.7$, $SD = 23.2$; Creative Dance: $M = 85.9$, $SD = 8.1$; No Dance: $M = 92.4$, $SD = 12.3$).

These results suggest that, taking into account the types of tasks used in the TCAM, the three groups were not different in terms of movement creativity before the administration of the study. In fact, the results show that the Creative Dance group does not exhibit any advantage over the other two groups in terms of motor creativity as measured by TCAM.

One possible reason for the lack of statistically significant results could be that a creative dance program does not affect creativity, or at least not those aspects of creativity that are measured by TCAM. Thus, a second and related reason for the lack of difference between the groups could be that the task is not sensitive enough to detect the differences in movement creativity, if they do in fact exist. That is, although such differences may exist, the test may not be a good instrument to use for detecting them. It is important to note that, as reviewed in Chapter 2, TCAM measures creative abilities

from the trait viewpoint in particular, and not creativity from the perspective of the cognitive/computational approach.

Overall, both the TCAM and TGMD results corroborate the hypothesis that the groups were not significantly different at the beginning of the study.

Experimental Task

Flexibility and Originality

This analysis took into account one mean score per child for each type of concept (abstract and concrete) for two trials. Overall ratings were computed by taking into account the responses between 1 (no response) and 5 (excellent) given for each question for each child by each judge. Each child then got two overall scores for each type of concept (abstract and concrete), which was the basis of the inferential analysis for the comparisons between Groups and Concept Types.

The raw data for the inter-judge reliability analysis were the mean score of each child as produced by each judge on each task, independent of group or creativity criterion (in this case, Flexibility and Originality). In other words, ratings by each judge for two creativity criteria and the three groups were combined only for the purpose of checking the inter-judge reliability. The overall scores from all five judges were positively correlated. Table 4 shows the correlation matrix for the five judges.

Table 4

Correlation matrix for all judges' scores in the Experimental Task, taking into account the mean scores they gave to each child for Flexibility and Originality

	Judge A	Judge B	Judge C	Judge D	Judge E
Judge A	1.00				
Judge B	0.81	1.00			
Judge C	0.71	0.65	1.00		
Judge D	0.77	0.77	0.71	1.00	
Judge E	0.69	0.73	0.62	0.74	1.00

An inspection of Table 4 shows that the weakest correlations are those involving Judge E. Table 5 shows the descriptive data for the scores produced by the five judges and the discrepancy between the data produced by judge E and the other judges.

Table 5

Judges' scores for all children collapsing Flexibility and Originality observational criteria

	Mean	Median	Mode	SD
Judge A	2.2	2.0	2.0	0.7
Judge B	2.0	2.0	2.0	0.6
Judge C	2.7	2.6	2.0	1.1
Judge D	2.4	2.4	2.0	0.8
Judge E	3.7	4.0	5.0	1.3

Based on the discrepancy of the scores between Judge E and the other four judges, the experimenter decided to remove that judge's scores from further analyses based on means for each child. In a personal communication with the experimenter, Judge E mentioned that she had difficulty following the scoring instructions and that she used her own criteria for counting the number of movements, and for rating children. As we can see from the descriptive analysis, Judge E's mode was 5 while for three other judges it was 2.

For the inferential analyses of the remaining four judges' scores, two main general analyses were done - one for the Flexibility and one for the Originality criteria. Scores were based on five-point Likert scales. Another analysis was done for the Fluency criterion, which is based on the total number of observed movement responses; see below. The raw data for the inferential analyses included two observations per Concept Type within each one of the creativity criteria. For instance, Child 1 (from the Ballet

group) performed the abstract concepts HAPPY and ASHAMED and the concrete concepts HORSE and LIZARD. For each one of these concepts there were eleven questions in the rating questionnaire; one for the Fluency criterion, five for the Flexibility criterion and five for the Originality criterion. For each concept there were three total scores; one corresponding to the Fluency criterion based on the number of responses the child produced, one corresponding to the mean of the five Flexibility questions, and one corresponding to the mean of the five Originality questions. Since each child performed four concepts - two of each type - and there were three observational criteria for each concept, there were a total of twelve observations per child corresponding to the three main variables. Table 6 presents the mean of each group according to the different judges, taking into account the two types of concepts and two creativity criteria, Flexibility and Originality.

Table 6

Mean Group Ratings (and Standard Deviations) Based on two Creativity Criteria (Flexibility and Originality) for Tasks with Abstract and Concrete Concepts

	Concept Type			
	Abstract		Concrete	
Group	Mean	SD	Mean	SD
	Originality			
Ballet	2.03	0.62	2.35	0.52
Creative Dance	2.12	0.63	2.41	0.60
No Dance	2.32	0.63	2.41	0.59
	Flexibility			
Ballet	2.18	0.76	2.52	0.59
Creative Dance	2.18	0.79	2.57	0.74
No Dance	2.39	0.67	2.59	0.69

Two two-way ANOVAs with repeated-measures on the Concept Type factor, were run. For each analysis Group (Ballet, Creative Dance, No Dance) and Concept Type (concrete, abstract) were the independent variables and the observational criteria (Flexibility or Originality) was the dependent variable. For the analysis of Flexibility, there was no main effect of Group, $F(2, 32) = 0.17$, $p = .85$), and a significant effect of Concept Type, $F(1, 32) = 8.37$, $p = .007$, but no interaction between these two variables, $F(2, 32) = 0.3$, $p = .74$. The pattern of results was similar for the analysis of the

Originality criterion, with no main effect of Group, $F(2, 32) = 0.31$, $p = .74$, a significant difference between Concept Types, $F(1, 32) = 6.59$, $p = .015$, but no interaction between the two factors, $F(2, 32) = 0.6$, $p = .55$.

Fluency

For the analyses of the Fluency criterion, the raw data were the mean number of movements performed by each child as observed by the judges. Once again, for these analyses, data from Judge E were not included. This judge did not count the number of movements correctly, scoring the total number of transitions between gestures and also scoring separately movements from different limbs that occurred at the same time. Table 7 shows the correlation between the remaining four judges' Fluency scores.

Table 7

Correlation Matrix for Judges' Fluency Scores

	Judge A	Judge B	Judge C	Judge D	Judge E
Judge A	1.00				
Judge B	0.94	1.00			
Judge C	0.88	0.84	1.00		
Judge D	0.94	0.92	0.84	1.00	
Judge E	0.88	0.87	0.84	0.90	1.00

All scores are highly correlated, suggesting consistency in the analysis of Fluency between judges. However, the descriptive data show that Judge E once again produced scores overall higher than the other judges. In fact, the way the judge scored the

movements by counting every limb movement and every "transition" (personal communication) between movements.

Table 8

Shows the Descriptive Data for the Fluency Scores.

	Mean	Median	Mode	SD
Judge A	2.5	2.0	1	2.7
Judge B	1.9	1	1	2.2
Judge C	2.3	1	1	2.8
Judge D	2.5	2	1	2.9
Judge E	10.3	8.0	6	10.5

Following the same criterion used in the analysis of originality and flexibility, Judge E was eliminated for the inferential analyses of the fluency criterion. Thus, for all analyses, the mean of each child in each condition was taken into account. The mean of each condition for each group averaged across judges is presented in Table 9.

Table 9

Mean Fluency Scores for the Expression of Abstract and Concrete Concepts

	Concept Type			
	Abstract		Concrete	
Group	Mean	SD	Mean	SD
Ballet	1.81	1.9	2.88	3.8
Creative Dance	1.88	2.02	2.29	1.5
No Dance	1.92	1.3	2.82	2.9

A two-way ANOVA was run, taking into account Fluency as the dependent variable and Group (Ballet, Creative Dance, No Dance) and Concept Type (concrete, abstract) as the independent variables. For this criterion, the pattern of results was identical to the other two criteria, with no main effect of Group, $F(2, 32) = 0.06$, $p = .94$, and again a significant difference between Concept Types, $F(1, 32) = 5.25$, $p = .03$, and no interaction between the two factors, $F(2, 32) = 0.33$, $p = .72$.

These results suggest once again that children from the three different backgrounds are not different in the expression of concepts when the Fluency observational criterion is taken into account. The main effect of Concept Type also supports previous results with the Flexibility and Originality criteria. Children appear to have more fluency in the expression of concrete concepts than abstract concepts.

Overall, the results of the experimental task points to a lack of difference between groups. The results show that dance background does not seem to have an effect on the

expression of concepts when both abstract and concrete concepts are taken into account. Although not statistically significant, these results tend to support previous results obtained in the literature (e.g., Jay, 1991; Roseman, 1984; Walls, 1971) in which a creative dance program did not affect creativity performance. In summary, it seems that using different tests and observational criteria, all studies fail to support the general claim that a creative dance program targets creativity, divergent thinking, and the physical expression of concepts.

These results by no means go *against* the efficacy of a creative dance program in many aspects of the cognitive and physical development of children. However, they show that those benefits either cannot be measured or detected by a variety of tasks and observational criteria, or are beyond the reach of such tasks. In the next chapter, some of the main results, limitations, and implications of the present study are discussed.

CHAPTER 5: CONCLUSIONS

Introduction

In this chapter, the results of the current study are summarized, followed by a brief discussion of some of the main methodological issues related to the study. The main hypothesis of this study was that children with creative dance background would do better on tasks that involve physical expression of concepts (abstract and concrete). This hypothesis was based on the widely held view that creative dance enhances cognitive abilities (see Chapter 2). Three groups of children participated in this study: children with ballet background, children with creative dance background, and children with no dance background. They participated in two standardized tests (TGMD and TCAM) and one experimental task. Five experts in dance education observed and rated each child's performance through videotape. Creativity criteria (fluency, originality and flexibility) were employed in a rating questionnaire designed to assess children's physical expression of concepts, which are taken to be basic elements of thought.

Overall the results of the standardized tests indicated that there were no statistically significant differences between the three groups regarding creativity in movement as measured by TCAM. The results of the experimental task indicate that no significant differences were found between the three groups on tasks involving physical expression of concepts. However, the results show a difference between the concrete and abstract concepts for all groups. Children did better on tasks representing concrete

concepts than the abstract ones.

In sum, the overall negative results found in the empirical study - as well as in the two standardized tasks - raise questions about the influence of a creative dance program on children's expression of concepts. Notice that, in the descriptive statistics, the mean of the creative dance group was always the lowest or the second lowest among the three groups (see Tables 6 and 9).

Suggestions are put forth as to how creative dance classes can be used to target the creativity cognitive system, if in fact the negative results obtained here are an artifact of the methodological issues discussed. What the results might suggest regarding the differences between creativity theories and the role of creative dance in children's development and education are then discussed.

Summary of the Results

The TGMD results showed no significant differences among groups at the beginning of this study. This indicates that all the children that participated in this study were at the same level overall in terms of their gross motor development. Hence, one non-equivalence threat was controlled.

The TCAM results showed that there were no statically significant differences between groups on movement creativity, suggesting that the groups could not be distinguished on basic creativity tasks based *directly* on Torrance's criteria. The results of this test, in particular, are relevant for our understanding of the results of the experiment.

Hence, initial differences in creativity, as measured by this test, were negligible. Recall that the motivation of this study was to investigate whether or not claims made in the literature about the benefits of creative dance education could be verified *empirically*. Moreover, it was also a motivation for the present study to investigate the actual elements of creative thinking, which are assumed to be concepts and their "materialization" in the form of physical expression. It has been assumed that the TCAM, although it is a standardized task, does not measure the way *concepts* are transformed into physical expression. That is, it does not target what are assumed to be the elements and objectives of creative dance education. It was assumed that TCAM measured the creative product using tasks such as "how many ways you can do this or that," - using a notion of creativity centered on *divergent thinking*. In fact, out of all of the activities in the TCAM, only one - "can you move like…" (Activity 2) - requires the physical expression of concepts to be the ones measured in the experiment directly to the "concrete concepts" employed in the experimental task. However, Torrance in fact assumes that to be "creative" one has to be above a certain mean. That is, one has to reach a certain threshold that would make one (or one's acts) unique compared to the norm. This means that the scores for Activity 2 are only taken into account insofar as they are compared to the norm. Therefore, it was important to show that in fact *all children* were equally "creative" *at that level of analysis*.

The experimental task was devised in order to investigate *whether* being exposed to a creative dance program would in fact be beneficial in terms of "improving" creativity as claimed in the pedagogical literature on creative dance (e.g., Drewe, 1996; Stinson,

1988). However, the notion of creativity that motivated the experimental task was somewhat different from that of Torrance's. The idea, as discussed in Chapter 2, was that if creativity is in fact a form of cognitive activity in which *thoughts* are translated into *movement expression,* then a natural place to look for the benefits of creative dance would be to see how children with and without creative dance experience would express concepts (which, as discussed, are the elements of thoughts). If it could be shown that the creative dance children were *better* at expressing concepts, despite being at the same level of motor development (TGMD) and showing the same skills in creative tasks (TCAM), then the direct benefits of a creative dance education could be demonstrated.

However, the experimental tasks also showed no overall statistically significant differences between the groups, indicating that the exposure to a creative dance program does not appear to enhance children's physical expression of concepts. Although the results of this thesis are mostly negative, the results are in consonance with several of the studies discussed earlier (Jay, 1991; Roseman, 1984; Wall, 1971). In all of the studies that employed similar methodologies and comparisons between groups to the present study, there seems to be a general agreement that the benefits of creative dance that are discussed by many authors (e.g., Joyce, 1980; Stinson, 1988) cannot be detected by a variety of tasks and procedures.

Creative Dance and Creativity

The hypothesis raised in Chapter 2 was that, in the context of creative dance, creativity could be seen as a process by which children generate movement ideas and

transform them into physical expression. In reviewing the theories of creativity discussed in Chapter 2, we have seen that, according to Boden's (1992) and Johnson-Laird's (1988) views, creativity is taken to be a cognitive system for generating novel ideas (novel at least for the individual who generates them). This "creative system" is, by hypothesis, common to all individuals; it is a universal cognitive system for combining ideas (concepts) in novel ways. We have also seen that the "interactive" approach to creativity (Gardner, 1982) postulates that creativity is subject to socio-developmental and educational factors, which contribute to an individual being more or less "creative". This approach is in a way similar to the more classical view of creativity (Guilford, 1967; Torrance, 1981). According to this "classical" view, creativity is a trait whose products are measurable through standardized tests, which indicate how far from a given norm people deviate. This view assumes that creativity is a matter of "intelligence" or a capacity for generating ideas that deviates from a norm: the more common (according to normative tests) a given response to a problem is, the less creative it is judged to be, thus, the less "creative" the person is also judged to be.

It was argued that the three views overlap in the sense that creativity could be seen as a process for generating ideas--perhaps a universal system--a system that could be influenced by educational and social environments, and a system whose products could be measured by tests. An interesting aspect of this approach is that it seems to capture the essences of different views. Although this "eclectic" view of creativity could be criticized (Bouffard, 2000), at the current stage of theoretical development concerning creativity,

we can recognize that the three theories discussed in Chapter 2 all contribute to our understanding of creative processes and products.

Another important point to be considered is that creativity and creative dance, as an activity that targets creative development, deal with concepts. As discussed above, concepts should be taken as the primitive constituents of ideas and thoughts. This is important to point out in virtue of the claims made in the creative dance literature regarding the supposed benefits of creative dance as an educational activity. If in fact creative dance targets the development of creativity, then it targets the way concepts are put together to form ideas or thoughts, which are then expressed in movement.

In light of the results of the present study, it is worth mentioning which of the approaches to creativity could be said to have been supported empirically. The data suggest that the theory that assumes creativity to be a computational generative system for putting ideas (concepts) together to form thoughts is the one we should focus on. In this particular context, thoughts are seen as expressed into movement form but their products are not evaluated. Instead, they are simply taken to be the product of a given mechanism that is responsible for putting the ideas of movement together.

If this is true, then we can see that creativity in the context of physical expression of concepts is similar to an act of improvisation in dance. Johnson-Laird (1988) discusses a computer program that is capable of improvising jazz musical pieces. The essence of the program is that it takes a given input (a sequence of notes) and creates (improvises) a melody based on that initial sequence. What is important to note regarding this program is that it is "creative" in the sense that it is capable of creating a sequence that is novel.

We can also think of the way dance improvisation works as a form of this pure "generative" form of creativity. In dance improvisation, the dancer needs to create on-the-spot sequences of movement that are novel. The sequences of thoughts that lead to physical expression need to be formed just before the actual movements are executed. Again, this form of thought-language/body-language correspondence can be seen as generated by the creative system that translates one form of thought into another before execution by the motor system.

If in fact dance background does not affect the way thoughts are expressed into movement, then the creative system may be immune to the influence of creative dance activity. If so, all children—those with and those without a creative dance education background—may be deemed potentially equally creative, that is, all may be taken to have a similar mechanism that translates thought language into body language.

Methodological Issues

The goal of the present section is to address some methodological issues that, in principle, could be raised about the lack of effects found in this study. The issues are mainly related to the age of the participants, the gender differences, years of training in dance, the appropriateness of the "word and movement game", and the variability between judges.

Age Group

The age of the participants (6 to 7 years old) was selected taking into account

Gardner's (1982) claims about artistic development. He suggested that children between 5 and 7 years old are at their "peak of artistic development" (p. 89). Gardner proposes a U-Shaped model to understand and evaluate children's artistic ability. This U-shape suggests that on the first tip of the "U" is the first "peak" age for artistic expression (approximately 5 years old). As the child gets older this may decline and increase again around adolescence. More specifically, the kindergarten years are seen as the "golden age" period of children's artistic development, according to Gardner. If in fact children of this age group are viewed as very "creative" (see Chapter 2 on Gardner's view of creativity), we can assume that their physical expression of ideas would also be best expressed around this age. Therefore, the decision to test for the possible effects of creative dance education for this age group was motivated by the hypothetical "peak" of children's artistic and creative development.

It is claimed in the literature that creative dance might help to develop creativity in movement, imagination, learning and understanding of curricular material, aesthetic and artistic abilities, cognitive abilities, and physical skills (Drewe, 1996; Smith-Autard, 1994; Stinson, 1988). Since differences were not shown for children of this age group, and if in fact creative dance does help develop creativity in movement, it is possible that it may show up later on in life, perhaps after the "golden age".

Gender Differences

One of the methodological issues we could raise regarding the present study is related to the unequal number of boys and girls (eight boys and 27 girls). The eight male participants were all from the no dance background. It is possible that there was a gender

bias such that boys were not enrolled in the classes from which participants were recruited (or, in a few cases, did not volunteer to participate). However, the gender difference was not considered an issue for the purpose of the experimental tasks based on the assumption that the cognitive mechanism that translates ideas into movement by hypothesis does not depend on gender specification. If this is true, boys and girls should have the same cognitive capacity to express their thoughts into movement concepts. Gardner does not point to gender as a factor that sets apart boys from girls in terms of creative development. It should be noted that neither of the two standardized tests, TGMD and TCAM, provide norms for boys and girls separately, suggesting that the assumption of equal cognitive and motor skills may be valid.

In fact, the results of the one-way ANOVAs for both the TGMD and TCAM tests of the no-dance group taking into account gender as a factor indicated that there were no differences between boys and girls (TGMD: $F(1,10) = 0.37$, $p = .35$; TCAM: $F(1,10) = 0.45$, $p = .84$; see Table 10 for descriptive data). For the experimental task, also for the same no-dance group, three two-way ANOVAs (gender and concept type) one for each creativity criterion with repeated measures in the concept type factor showed no difference between boys and girls (Fluency: $F(1,10) = 0.66$, $p = .34$; Originality: $F(1,10) = 0.00$, $p = .99$; Flexibility: $F(1,10) = 0.08$, $p = .79$; see Table 11 for descriptive data).

Table 10

TGMD and TCAM Means and Standard Deviations for the No Dance Group in the Analyses by Gender

Gender			
Male		Female	
Mean	SD	Mean	SD
TGMD			
7.2	2	7	2.4
TCAM			
89.8	9.4	91.4	17.4

Table 11

Means and Standard Deviations for the No Dance Group in the Analyses by Gender for the Experimental Task

Creativity Criterion	Gender			
	Male		Female	
	Mean	SD	Mean	SD
	Abstract Concepts			
Flexibility	2.4	0.7	2.4	0.7
Originality	2.3	0.6	2.3	0.7
Fluency	1.9	1.4	2	1.4
	Concrete Concepts			
Flexibility	2.6	0.6	2.5	0.9
Originality	2.4	0.5	2.4	0.8
Fluency	2.2	1.2	4	5.1

However, the gender variable should perhaps be taken into consideration in future studies employing a similar methodology as the one employed here. Only then can we put aside the possibility that the present results are artifacts of a gender difference and not simply an effect of other variables such as age and lack of difference between dance backgrounds.

Dance Training

Another possible issue to be considered here is the minimum amount of training established as a criterion to participate in this study. A period of six months of dance training in either ballet or creative dance was the minimum requirement. This information regarding background of the participants was collected from a questionnaire filled out by the parents at the time of the study. It is possible that six months was not enough to show significant changes in the effect of creative dance on tasks that express thoughts through body language. Studies that employed a similar methodology, however, relied on even shorter periods of training. In Wall's (1971) and Jay's (1991) studies, for instance, the creative dance groups received training for 12 weeks, while in Roseman's (1984) study the period of training was "one semester". None of these studies found differences between groups. Therefore, a longer period of dance training should be considered for future research, if in fact differences between creative dance and other forms of movement background are to be found.

Appropriateness of the Experimental Task

An important issue regarding the present study is the appropriateness of the experimental task (word and movement game) for testing for differences in creativity in movement expression. The main experimental task was composed of words (related to particular types of concepts) and a few sentence cues presented to the children (see Appendix G). It is possible that the sentence cues could have had some negative effect on the children by constraining in some way their performances. It is important to note that the study was designed this way because it would have been difficult to analyze the

children's performances if they were completely free to move. Thus, some guidance was necessary to start the movement, but the children were allowed to stop moving whenever they wanted. This method allowed for the movements to be analyzed according to the established criteria (Originality and Flexibility) and counted (Fluency).

It is possible that a different task than the one employed here would lead to different results. For instance, if the children had been given more concepts to express (instead of only four), judges would have had more data on which to judge the children's performance. This way, differences between groups may have been found. It remains to be seen in future studies whether or not increasing the number of concepts would yield different results than the ones reported here.

Judge Variability

Another issue to be mentioned here is the variability between judges. Five judges volunteered to participate in this study. They had backgrounds in several dance techniques (ballet, creative dance, modern dance, and jazz), extensive experience in teaching different types of dance to different groups, as well as different types of educational backgrounds.

It is possible that these differences could have caused some discrepancy in the total scores produced by the five judges. It is possible to imagine that a judge with a background strictly in ballet would judge a child from the Ballet group to be performing better at a certain task simply because, for instance, that child uses elements of ballet technique in their performance. It is worth mentioning that a preliminary analysis of the experimental data taking the judges' scores as an independent variable yielded no

interactions between judge and the other factors of Group and Concept Type. Differences between judges were significant, but since these were based on their raw scores, the fact that there were no interactions with the main factors of this study reveals that the data produced by the judges were consistent despite the differences in their backgrounds. In any case, it is possible to conceive that judges with backgrounds different from the judges from this study would yield different results. Future studies in this area could also account for this factor.

On the Relevance of Creative Dance

According to the literature, creative dance seems to constitute a very important aspect of the physical and cognitive development of young children (Drewe, 1996; Smith-Autard, 1994; Stinson, 1988). It is claimed that creative dance can also be used as a learning tool to teach several curriculum areas in elementary school (Drewe, 1996; Smith-Autard, 1994), as well as to develop a broad understanding of other art forms. By assumption, through the creative dance lesson one can learn and understand artistic and aesthetic concepts. It has also been said that in creative dance lessons children explore basic concepts of the elements of movement (Laban, 1975).

Although many of those claims are intuitively and perhaps observationally valid, thus far all controlled studies found no evidence to support them. However, if one agrees with (or questions) the claims stated above, one should agree that it is very important to continue to investigate and support experimental studies in the area of creative dance in order to find out more about specific contributions of this type of activity to children's overall development. As we have seen, many methodological issues can be raised related

to this and other studies in this area. What is more important is that so far none of the experimental studies investigated the long-term effects of a creative dance program (that is, more than six months). It is possible that all the claims made in the literature may be found to be corroborated if studies employ groups of children who have been exposed to the supposed benefits of a dance education program for a long period of time. Also, the inclusion of creative dance in the elementary curriculum should be looked at as an educational necessity for young children's artistic development (Gardner, 1982), if in fact children benefit from being exposed to different forms of art programs.

Hopefully, the present study will motivate future studies to investigate the intersection of creative dance and cognitive psychology in order to contribute to an understanding of what actually happens to children's intellect once they participate in creative dance programs. Also, it would be relevant for this area to investigate the overall benefits (if any) of creative dance to children's artistic and aesthetic development. Not many studies have been done involving dance and cognitive issues. Thus, it is hoped that future research will find ways to refine the present study and propose new methods to investigate this fascinating intersection of disciplines where one's mind has to look for alternatives for translating ideas into movement expressions.

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Appendices

Appendix A: Schools from where participants were recruited

Group / School	No. of Participants
Creative Dance	
Royal Community Garden Creative Dance Program	3
University of Alberta Creative Dance Program	9
Ballet	
Darlene's Dance Academy	3
Marr Mac Dance and Theater Arts	1
Dance Unlimited	2
Edmonton School of Ballet	2
Edmonton Dance Centre	1
Holy Cross School	1
University of Alberta Creative Dance Program	1
No-Dance	
Child Study Centre at the University of Alberta	7
New Horizon School	2
Victoria Composite School	1
Windsor Park School	1
Capilano School	1

Appendix B: Questionnaire with the children's background

Dear Parent or Guardian:

If your child will be participating on this observational study about children's physical expression of concepts please take a minute to fill out this form regarding your child's background.

Student's First Name: _____Age: ____Years,_____Months

School's Name:_____Grade:_____

1. Has the student taken any kind of dance class before? YES_____NO_____

If YES, what kind of class?_____For how long?_____

2. Is the student currently taking any kind of dance class? YES ___ NO_____

If YES, what kind of class?_____For how long?_____

If YES, how often (how many times a week, month)_____

3. If answered YES for any of the questions above, please briefly comment on your motivations for enrolling your child in a dance program_____

_____

_____

_____

_____

Thank you very much for your time and cooperation.

Andrea I. de Almeida,
Faculty of Physical Education and Recreation
University of Alberta

Appendix C: Letter of information to parents

Dr. Marcel Bouffard
(780) 492-3566

Andrea I. de Almeida
(780) 437-6566

INFORMATION LETTER

Date:
Dear Parents or Guardians:

We are presently conducting a study on the physical expression of concepts by young children. Physical expression of concepts, as employed in this study, consists of expressing an idea (represented by words such as "happiness" and "cat", for example) into movement. Briefly, we would like to investigate how children express concrete and abstract concepts in movement tasks. We would like to have the opportunity to work with your child to further our knowledge of this issue. It is expected that this study will contribute to the understanding to the role of dance experiences in the way children represent and express concepts. Also, it is expected that this study will contribute to the understanding of the relevance of dance in the regular school curriculum.

The children will be assessed in two phases. In the first phase, they will be given two standardized tests, the Test of Gross Motor Development (TGMD) and Torrance's Test of Thinking Creatively in Action and Movement (TCAM). The Test of Gross Motor Development consists of seven locomotor steps (run, jump, skip, slide, hop, gallop, leap, etc). The test on movement creativity consists of movement problems which address the child's ability to solve movement tasks. These two tests will be administered by a physical educator major from the Faculty of Physical Education and Recreation under the assistance of the investigator. In order to administer both tests individually each child will be assigned a specific time slot (approximately 20 minutes) to perform the motor skills test and 20 minutes to perform the movement creativity test. The study will be conducted at the University of Alberta in the Physical Education Building room E-19 on __/__/ 99 at __:__. Children will be asked to wear shorts, t-shirts and sneakers. Undergoing the two tests should take approximately 40 minutes.

In the second phase, they will be assessed in movement tasks. The children will participate in movement tasks that involve physical expression of concrete concepts for approximately 15 minutes, followed by movement tasks that involve physical expression of abstract concepts, for approximately 15 minutes. The movement tasks session will require approximately 30 minutes. The movement tasks will be administered by a dance teacher unknown to any of the children with the assistance of the investigator. This second phase of the study children will be conducted to another dance studio in the same

building at the University of Alberta in the Physical Education Building room W-14. Children will be asked to wear shorts, t-shirts and bare feet.

Because of the large number of children and the diversity of settings involved in the study, children will be randomly assigned to participate individually on the TGMD and the TCAM tests. After completing the first phase, children will participate in pairs with children of the same age group from two other schools. In the second phase of the study, children will be videotaped in order to facilitate further data analysis.

We would like to emphasize that your child will not be subject to any risk of physical or psychological harm as a direct result of participating in this study. Participant records will be kept confidential by storing them in a locked filing cabinet in the supervisor's office at the University of Alberta. Only experts judges will view the video tapes for the purpose of data analysis. Of course, if you would like to see how your child performed, this could be arranged by contacting the researchers at the numbers indicated below.

Permission to conduct the study has been granted by the Ethics Committee of the Faculty of Physical Education and Recreation at the University of Alberta. Should you allow your child to participate, you and your child will have the option of withdrawing from the study at any time without consequence. This can be done by simply telling the researcher that you wish to withdraw your child from the study. The children will be informed (both by me and by the investigator) that he/she can withdraw at any time simply by telling the investigator that he or she does not wish to continue. If either my child or I withdraw from the study, my child's data can be withdrawn upon my request.

Data is normally retained for a period of 5 years post-publication, after which it is destroyed.

If you have any questions or concerns about this request, please do not hesitate to contact either Andrea I. de Almeida (437-6566) or Dr. Marcel Bouffard (492-3566) at the University of Alberta.

Thank you very much for your time and consideration.

Sincerely yours,

Graduate Student: Andrea I. de Almeida
(437-6566)

Supervisor: Dr.Marcel Bouffard
(492-3566)

Appendix D: Consent form

Dr. Marcel Bouffard **Andrea I. de Almeida**
(780) 492-3566 **(780) 437-6566**

CONSENT FORM

TITLE: Movement and Cognition

I hereby certify that _____(child's name), for whom I am the parent/guardian is allowed to participate in the research study conducted by Andrea I. de Almeida under the supervision of Dr. Marcel Bouffard. This study will be administered at the Faculty of Physical Education and Recreation at University of Alberta. I understand fully all of the following statements:

1. The study will require my child to participate in an investigation that addresses concepts and their physical expression. My child will not be subjected to any risk of physical or psychological harm as a direct result of participating in this study.

2. My child will be involved in two phases of a study. The first will require my child to participate in a basic locomotor skill test and a test of movement creativity. The motor test will consist of fundamental motor skills, more specifically, of seven locomotor steps (run, jump, skip, slide, leap, gallop, hop, etc). The movement creativity test will address the child's skills for solving movement-problem tasks. Participation in both tests will take approximately 40 minutes. The first phase of the study will take place at the University of Alberta in the Physical Education Building room E-19 on __/__ /99 at ___:___. Children will be asked to wear shorts and t-shirts and sneakers.

3. The second phase will require my child to participate in movement tasks that involve physical expression of concepts. This phase will last approximately 30 minutes. I understand that because of the large number of children and the diversity of settings involved in the study my child will be randomly assigned to participate in physical activities/movement tasks which will also involve children of the same age group from two other schools. The second phase of the study will take place in the same day in another dance studio at the University of Alberta in the Physical Education Building room W-14. Children will be accompanied by a research assistant from one studio to another. Children will be asked to wear shorts and t-shirts in bare feet. The two phases combined should take approximately 70 minutes.

4. The performance of my child will be videotaped. For purpose of data gathering and analysis the videotapes will be watched by the researchers and the expert judges - dance and physical educators. Participant records will be kept confidential and stored in a locked filing cabinet in the supervisor's office at the University of Alberta. Of course, if I would like to see how my child has performed on the tasks, this can be arranged by contacting researchers at the number indicated below.

5. I understand that my child is a volunteer and will not receive any remuneration for participating in this study. Further, either my child or I have the option of withdrawing from the study at any time without consequence. This can be done simply by telling the investigator that I wish to withdraw my child from the study. Also, my child will be informed (both by me and by the investigator) that he/she can withdraw at any time simply by telling the investigator that he or she does not wish to continue. If either my child or I withdraw from the study, my child's data can be withdrawn upon my request.

6. The University of Alberta creates and collects information for the purpose of research and activities directly related to its educational and research programs. All participants in research projects are advised that the information they provide, and any other information gathered for research projects, will be protected and used in compliance with Alberta's Freedom of Information and Protection of Privacy Act.

7. Data is normally retained for a period of 5 years post-publication, after which it is destroyed.

8. I understand that the data collected for this study will be used for a Master's thesis and possibly published in journal articles.

9. I have been given the opportunity to ask questions related to this project and these questions have been answered fully and to my satisfaction. Further, if I have any other questions or concerns about this request, I may contact either Andrea I. de Almeida (437-6566) or Dr. Marcel Bouffard (492-3566) at the University of Alberta at any time during the study.

10. I will receive a copy of this informed consent form.

Date: ___/___/___.

_____
(Student's Signature)

_____
(Name of Parent or Guardian - PLEASE PRINT)

_____
(Name of investigator- PLEASE PRINT)

_____
(Signature of Parent or Guardian)

_____
(Signature of Investigator)

_____
(TELEFPHONE for contact)

Appendix E: Sample TGMD test

Name _____

School/Agency _____

Sex: Male _____ Female _____ Grade _____

TGMD

TEST OF GROSS MOTOR DEVELOPMENT

Dale A. Ulrich

TESTING INFORMATION

1ST TESTING	Year	Month	Day
Date Tested			
Date of Birth			
Chronological Age			

Examiner's Name

Examiner's Title

Purpose of Testing

2ND TESTING	Year	Month	Day
Date Tested			
Date of Birth			
Chronological Age			

Examiner's Name

Examiner's Title

Purpose of Testing

RECORD OF SCORES

1ST TESTING Subtests	Raw Scores	%iles	Std. Scores
Locomotor Skills			
Object Control Skills			
Sum of Standard Scores =			
Gross Motor Development Quotient (GMDQ) =			

2ND TESTING Subtests	Raw Scores	%iles	Std. Scores
Locomotor Skills			
Object Control Skills			
Sum of Standard Scores =			
Gross Motor Development Quotient (GMDQ) =			

COMMENTS/RECOMMENDATIONS

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Appendix F: TCAM scoring booklet

thinking creatively in action and movement

BY E. PAUL TORRANCE

NAME _____ DATE _____

AGE _____ SEX _____

EXAMINER _____

EXPERIENCES _____

scores	flu	orig	imag.
activity 1 (How Many Ways?)			
activity 2 (Can You Move Like?)			
activity 3 (What Other Ways?)			
activity 4 (What Can You Do with a Paper Cup?)			
TOTAL			
STANDARD SCORE			

Published by
SCHOLASTIC TESTING SERVICE, INC.
480 Meyer Road
Bensenville, Illinois 60106-1617

ACTIVITY ONE (How Many Ways?)

Today we will have a lot of fun moving in interesting ways. I want you to think up as many ways as you can to walk or run. Do you see this piece of red tape? We will start running or walking here, and will go to the other side of the room until we get to the piece of yellow tape. (Walk between the two pieces of tape with the child)

Now it is your turn to walk and run for me. Think up as many fun ways as you can. While you are moving, I will sit here and write. You may begin now. (Do not give hints but continue motivating the child to show as many ways as he can for getting across the room. List each one.)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Time: _____

ACTIVITY TWO (Can You Move Like?)

Now we are going to do some more fun things. This time we are going to pretend. Sometimes we pretend we are birds, elephants, or horses. Other times we pretend we are throwing or catching a ball. (Warm-up by mimicking a bird flying, an elephant walking, and throwing and catching a ball. Encourage the child to act along with you.)

Now I am going to name several things and you can pretend that you are doing them. You don't have to tell me anything. You can just show me. (Circle the number that corresponds with the child's response.)

1. **Can you move like a tree in the wind? Imagine you are a tree and the wind is blowing very hard. Show how you would move.**

1	2	3	4	5
No movement		Adequate		Excellent; like the thing

2. **Can you move like a rabbit? Imagine you are a rabbit and somebody is chasing you. Show how you would hop.**

1	2	3	4	5
No movement		Adequate		Excellent; like the thing

3. **Can you move like a fish? Imagine you are a fish in a river or pond. Show how you would swim.**

1	2	3	4	5
No movement		Adequate		Excellent; like the thing

4. **Can you move like a snake? Imagine you are a snake crawling in the grass. Show how you would crawl.**

1	2	3	4	5
No movement		Adequate		Excellent; like the thing

5. **Can you move like you are driving a car? Imagine you are driving your car on the highway. Show how you would drive.**

1	2	3	4	5
No movement		Adequate		Excellent; like the thing

6. **Can you push an elephant? Imagine a big elephant is standing on something you want. Show how you would push him to make him move off of the thing you want.**

1	2	3	4	5
No movement		Adequate		Excellent; like the thing

Total Score: _____

Time: _____

ACTIVITY THREE (What Other Ways?)

Here is a cup just like the one you drink juice from. Can you put it in the wastebasket? Show me how you would do it. (Pause.) **Good. Now let's see how many other ways you can put the cup in the wastebasket. You don't have to say anything. Just show me. I have many cups and you can use as many as you want.** (List all responses. Accept verbal responses from children who are inhibited about acting.)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Time: _____

ACTIVITY FOUR (What Can You Do With a Paper Cup?)

You just thought of many ways to put a paper cup in the wastebasket. But sometimes you don't want to put your cup in the wastebasket. Instead you might want to play with it or imagine that it is something else. Let's see how many different things you can do with this juice cup. Show me or tell me. I have many cups for you to use. (List all responses).

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Time: _____ 4

Appendix G: Script of the experimental task

INSTRUCTIONS AND PROCEDURES FOR THE EXPERIMENTAL TASKS

Hi_____! My name is Andrea. How are you today,....etc.

We are going to play a game in which you will talk to me in a very special way. You will have to talk to me by moving your body without speaking. Would you be able to help me? This is going to be fun. I'm going to give you words and I 'll ask you to show me with your body the ideas you have in your head about these words. [Remember, I don't want you to show me what you think about a word by talking. I just want you to say what you think about these words by moving].

When you play this game, try to use your imagination as much as possible. You are going to show me as many ways as you can what the word means to you. There is no right or wrong idea and there is no right or wrong way of **showing me** with your body what you **think**. You can use your whole body, your arms, legs, etc as long as you stay within the space marked by the red tape. You can do whatever comes to your mind when I give you a word, OK?

If you can't think of anything else, that 's fine, just stop. Maybe you will get another idea in a moment. Try it too. You can keep moving for as long as you want to show me what those words mean to you. Let me know when you have finished.

Checklist: Those are the rules for the game we are going to play. Let's see if you remember them? I will ask you a question about the game and you can say YES or NO, Ok?

a) Can you speak?

YES_____ NO_____

b) Can you use your body to show me whatever comes to your mind about a word?

YES_____ NO_____

c) Can you move in as many different ways you want to show me what a word means to you?

YES_____ NO_____

d) Can I tell you when to stop?

YES_____ NO_____

OK, do you understand the game now? Great! Do you have any questions?

I will be video taping us so that I can study our work together, OK?

Ok. Let's begin now.

[Practice trials, one concrete and one abstract concept]

A- Show me with your body **whatever comes to your mind when I say the word** _____.

A.1 Can you show me in a different way?

A.2 Can you show me something else?

A.3 Can you show me another way?

A.4 Anything else?

B- Show me with your body **whatever comes to your mind when I say the word** _____.

B.1 Can you show me in a different way?

B.2 Can you show me something else?

B.3 Can you show me another way?

B.4 Anything else?

[Experimental trials, 2 concrete and 2 abstract concepts]

1- Show me with your body **whatever comes to your mind when I say the word _____.**

1.1 Can you show me in a different way?

1.2 Can you show me something else?

1.3 Can you show me another way?

1.4 Anything else?

Good job! Let's try another word now. Ready?

2- Show me with your body whatever comes to your mind when I say the word _____.

2.1 Can you show me in a different way?

2.2 Can you show me something else?

2.3 Can you show me another way?

2.4 Anything else?

Very good! Are ready for the next word?

3- Show me with your body whatever comes to your mind when I say the word _____.

3.1 Can you show me in a different way?

3.2 Can you show me something else?

3.3 Can you show me another way?

3.4 Anything else?

Great job! Can we try this game with another word?

4- Show me with your body whatever comes to your mind when I say the word _____.

4.1 Can you show me in a different way?

4.2 Can you show me something else?

4.3 Can you show me another way?

4.4 Anything else?

Thank you very much you did an excellent job! I really liked the way your _____ moved!

Appendix H: Words presented to each subject independent of group

Subject	Words			
1	horse	happy	lizard	ashamed
2	free	gorilla	scared	Robin
3	bee	angry	whale	cheerful
4	bee	angry	whale	cheerful
5	sad	rat	generous	Fox
6	chicken	surprise	frog	Upset
7	afraid	lazy	wolf	Pigeon
8	monkey	turtle	nervous	Brave
9	horse	happy	lizard	ashamed
10	free	gorilla	scared	Robin
11	free	gorilla	scared	Robin
12	bee	angry	whale	cheerful
13	sad	rat	generous	fox
14	sad	rat	generous	fox
15	chicken	surprise	frog	upset
16	bee	angry	whale	cheerful
17	chicken	frog	surprised	upset
18	proud	bored	duck	pig
19	afraid	lazy	wolf	pigeon
20	spider	lion	gentle	embarrassed
21	fear	joy	bear	sheep
22	monkey	nervous	turtle	brave
23	lamb	squirrel	worried	excited
24	glad	lovely	rabbit	tiger
25	afraid	lazy	wolf	pigeon
26	monkey	turtle	nervous	brave
27	moose	shark	lucky	calm
28	proud	bored	duck	pig
29	proud	bored	duck	pig
30	spider	lion	gentle	embarrassed
31	fear	joy	bear	sheep
32	fear	joy	bear	sheep
33	lamb	squirrel	worried	excited
34	afraid	lazy	wolf	pigeon
35	bee	whale	angry	cheerful

Appendix I: Booklet 2 Rating Questionnaire

Movement & Cognition

Booklet 2

Rating Questionnaire

Andrea I. de Almeida
M.A. candidate
Department of Physical Education
University of Alberta
Home phone: (514) 939-5518
E-mail: aid@ualberta.ca

Supervisor: Dr. Marcel Bouffard

Rater # _____

Child # _____
Please indicate the child's tag number as shown in the video

© 1999 Andrea I. de Almeida

Please pause the tape and rate each performance after its completion.

WORD # 1:_____
Please write down the word presented to the child

1. **Fluency**: Please count how **many different movement** responses you observed in the child's performance.

Total Number of Movement Responses = _____

---

2. **Flexibility**:

2.1 **Please rate the child's Flexibility in the use of Shape**. Look for the different changes in movement in the use of wide, long, round, twisted, symmetrical or asymmetrical shapes.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.2 **Please rate the child's Flexibility in the use of Space**. Look for the different changes in movement in the use of space, i.e, in the use of levels, pathways, and directions.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.3 **Please rate the child's Flexibility in the use of Time**. Look for the different changes in movement in the use of time, i.e., ranging from slow to fast, from constant to changing, from gradual to sudden.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.4 **Please rate the child's Flexibility in the use of Flow**. Look for the different changes in movement in the use of flow, i.e., ranging from free to bound movement.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.5 **Please rate the child's Flexibility in the use of Weight.** Look for the different changes in movement in the use of weight, i.e., ranging from heavy to light.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

---

3. **Originality**:

3.1 **Please rate the child's Originality in the use of Shape**. Look for the degree of **unusual changes** in the use wide, long, round, twisted, symmetrical or asymmetrical shapes.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.2 **Please rate the child's Originality in the use of Space**. Look for the degree of **unusual changes** in the use of space, i.e., the range of **unusual changes** in the use of levels, pathways, and directions.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.3 **Please rate the child's Originality in the use of Time**. Look for the degree of **unusual changes** in the use of time, i.e., the range of **unusual changes between** fast to slow tempos.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.4 **Please rate the child's Originality in the use of Flow**. Look for the degree of **unusual changes** in the use of flow, i.e., the range of **unusual changes** between free to bound (how much variety of free or bound movement the child showed on his/hers physical expression of an idea).

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.5 **Please rate the child's Originality in the use of Weight**. Look for the degree of **unusual changes** in the use weight; changes between heavy and light movements.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

Please turn page for WORD # 2

Please pause the tape and rate each performance after its completion.

WORD # 2:_____
Please write down the word presented to the child

1. **Fluency**: Please count how **many different movement** responses you observed in the child's performance.

Total Number of Movement Responses = _____

---

2. **Flexibility**:

2.1 **Please rate the child's Flexibility in the use of Shape**. Look for the different changes in movement in the use of wide, long, round, twisted, symmetrical or asymmetrical shapes.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.2 **Please rate the child's Flexibility in the use of Space**. Look for the different changes in movement in the use of space, i.e, in the use of levels, pathways, and directions.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.3 **Please rate the child's Flexibility in the use of Time**. Look for the different changes in movement in the use of time, i.e., ranging from slow to fast, from constant to changing, from gradual to sudden.

1.	2.	3.	4.	5.

No response Poor Fair Good Excellent

2.4 **Please rate the child's Flexibility in the use of Flow**. Look for the different changes in movement in the use of flow, i.e., ranging from free to bound movement.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.5 **Please rate the child's Flexibility in the use of Weight.** Look for the different changes in movement in the use of weight, i.e., ranging from heavy to light.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

---

3. **Originality**:

3.1 **Please rate the child's Originality in the use of Shape**. Look for the degree of **unusual changes** in the use wide, long, round, twisted, symmetrical or asymmetrical shapes.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.2 **Please rate the child's Originality in the use of Space**. Look for the degree of **unusual changes** in the use of space, i.e., the range of **unusual changes** in the use of levels, pathways, and directions.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.3 **Please rate the child's Originality in the use of Time**. Look for the degree of **unusual changes** in the use of time, i.e., the range of **unusual**

changes between fast to slow tempos.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.4 **Please rate the child's Originality in the use of Flow**. Look for the degree of **unusual changes** in the use of flow, i.e., the range of **unusual changes** between free to bound (how much variety of free or bound movement the child showed on his/hers physical expression of an idea).

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.5 **Please rate the child's Originality in the use of Weight**. Look for the degree of **unusual changes** in the use weight; changes between heavy and light movements.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

Please turn page for WORD # 3

Please pause the tape and rate each performance after its completion.

WORD # 3:_____
Please write down the word presented to the child

1. **Fluency**: Please count how **many different movement** responses you observed in the child's performance.

Total Number of Movement Responses = _____

---

2. **Flexibility**:

2.1 **Please rate the child's Flexibility in the use of Shape**. Look for the different changes in movement in the use of wide, long, round, twisted, symmetrical or asymmetrical shapes.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.2 **Please rate the child's Flexibility in the use of Space**. Look for the different changes in movement in the use of space, i.e, in the use of levels, pathways, and directions.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.3 **Please rate the child's Flexibility in the use of Time**. Look for the different changes in movement in the use of time, i.e., ranging from slow to fast, from constant to changing, from gradual to sudden.

1.	2.	3.	4.	5.

No response Poor Fair Good Excellent

2.4 **Please rate the child's Flexibility in the use of Flow**. Look for the different changes in movement in the use of flow, i.e., ranging from free to bound movement.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.5 **Please rate the child's Flexibility in the use of Weight.** Look for the different changes in movement in the use of weight, i.e., ranging from heavy to light.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

---

3. **Originality**:

3.1 **Please rate the child's Originality in the use of Shape**. Look for the degree of **unusual changes** in the use wide, long, round, twisted, symmetrical or asymmetrical shapes.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.2 **Please rate the child's Originality in the use of Space**. Look for the degree of **unusual changes** in the use of space, i.e., the range of **unusual changes** in the use of levels, pathways, and directions.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.3 **Please rate the child's Originality in the use of Time**. Look for the degree of **unusual changes** in the use of time, i.e., the range of **unusual changes between** fast to slow tempos.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.4 **Please rate the child's Originality in the use of Flow**. Look for the degree of **unusual changes** in the use of flow, i.e., the range of **unusual changes** between free to bound (how much variety of free or bound movement the child showed on his/hers physical expression of an idea).

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.5 **Please rate the child's Originality in the use of Weight**. Look for the degree of **unusual changes** in the use weight; changes between heavy and light movements.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

Please turn page for WORD # 4

Please pause the tape and rate each performance after its completion.

WORD # 4:_____
Please write down the word presented to the child

1. **Fluency**: Please count how **many different movement** responses you observed in the child's performance.

Total Number of Movement Responses = _____

---

2. **Flexibility**:

2.1 **Please rate the child's Flexibility in the use of Shape**. Look for the different changes in movement in the use of wide, long, round, twisted, symmetrical or asymmetrical shapes.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.2 **Please rate the child's Flexibility in the use of Space**. Look for the different changes in movement in the use of space, i.e, in the use of levels, pathways, and directions.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.3 **Please rate the child's Flexibility in the use of Time**. Look for the different changes in movement in the use of time, i.e., ranging from slow to fast, from constant to changing, from gradual to sudden.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.4 **Please rate the child's Flexibility in the use of Flow**. Look for the different changes in movement in the use of flow, i.e., ranging from free to bound movement.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

2.5 **Please rate the child's Flexibility in the use of Weight.** Look for the different changes in movement in the use of weight, i.e., ranging from heavy to light.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

---

3. **Originality**:

3.1 **Please rate the child's Originality in the use of Shape**. Look for the degree of **unusual changes** in the use wide, long, round, twisted, symmetrical or asymmetrical shapes.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.2 **Please rate the child's Originality in the use of Space**. Look for the degree of **unusual changes** in the use of space, i.e., the range of **unusual changes** in the use of levels, pathways, and directions.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.3 **Please rate the child's Originality in the use of Time**. Look for the degree of **unusual changes** in the use of time, i.e., the range of **unusual changes between** fast to slow tempos.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.4 **Please rate the child's Originality in the use of Flow**. Look for the degree of **unusual changes** in the use of flow, i.e., the range of **unusual changes** between free to bound (how much variety of free or bound movement the child showed on his/hers physical expression of an idea).

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

3.5 **Please rate the child's Originality in the use of Weight**. Look for the degree of **unusual changes** in the use weight; changes between heavy and light movements.

1.	2.	3.	4.	5.
No response	Poor	Fair	Good	Excellent

Please feel free to comment on the child's performance.

Appendix J: Booklet 3: Information about the raters

Movement & Cognition

Booklet 3

Information about the Raters

Andrea I. de Almeida
M.A. candidate
Department of Physical Education
University of Alberta
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E-mail: aid@ualberta.ca

Supervisor: Dr. Marcel Bouffard

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Dear teacher and colleague:

I would appreciate if you'd take some time to answer the questions below regarding your background as a dance teacher. The reliability of your observations, your knowledge and experience in the field of dance are essential to help me investigate the main questions addressed in this study.

Name:_____

Age: _____

Where are you originally from? _____

Please briefly indicate your dance/movement background: _____

_____

_____

_____

Which age group are you currently teaching?

_____

Total years of dance studies_____

Years of undergraduate study in dance _____

Years of graduate study in dance_____

Degree: Major:

(even if not complete)

[ ] High School

[ ] Baccalaureate _____

[ ] Master _____

[ ] Doctor _____

Years of experience teaching dance to children _____

Settings you teach/taught Years

(please check all that apply)_____

[ ] Public School _____

[ ] Private School _____

[ ] Dance School _____

[ ] Arts School/Conservatory _____

[ ] Other _____ _____

Which techniques have you taught/ are teaching to children (please check all that apply)

[ ] Tap

[ ] Jazz

[ ] Ballet

[ ] Creative Dance/Creative Movement

[ ] Modern
[ ] Other _____

Which techniques have you taught/are teaching to adults (please check all that apply)
[ ] Tap
[ ] Jazz
[ ] Ballet
[ ] Creative Dance/Creative Movement
[ ] Modern
[ ] Other _____

How do you rate the importance of teaching dance to children?
[ ] Very important
[ ] Important
[ ] Somewhat important
[ ] Not important

Please comment on the difficulty of the task, the format of the rating system or any other issue that you would like to address in the space provided below. Your knowledge and experience are very important for the interpretation and good quality of this data. All comments are very welcome!!

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Appendix K: Booklet 1: Rating Instructions

Movement & Cognition

Booklet 1

Rating Instructions

Andrea I. de Almeida
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University of Alberta
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Supervisor: Dr. Marcel Bouffard

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Observational Procedure and Instructions for the Raters

Please read the information below carefully!

In this study you will watch a video of children physically expressing concepts. The video shows individual performance of children on tasks involving physical expression of concrete and abstract concepts. Four concepts (words) were presented to each child, two words for the category of animals (concrete) and two words for the category of feelings (abstract).

Children were told to use their imagination as much as possible when trying to physically express an idea. They were told to move for as long as they wanted in order to show physically what a word/idea meant to them; they were told to stop when they ran out of ideas. No specific time frame was established for the physical expression of an idea. However, children were asked to show/express a certain idea by trying different ways of moving.

Please read carefully the instructions below and if you have any questions please contact Andrea de Almeida (514-939-5518; aid@ualberta.ca). Thank you very much for your collaboration.

Observational Criteria:

Guilford's (1971) theory of creativity and a general definition of the elements of movement (Laban, 1975) will be used to assess children's performance. According to Guilford, essential indicators of creativity are *fluency, flexibility and originality* (defined below). Laban's elements of movement include *shape, space, time, flow and weight* (also defined below). Because Guilford's definitions of flexibility and originality are fairly abstract and difficult to use in coding performance, the elements of movement proposed by Laban will be used to code performance in relation to flexibility and originality. In summary, for each expression of a concept (i.e., for each word), you will be asked to answer 11 questions.

Table 1 below shows that fluency will be measured with one question while both flexibility and originality will be measured by answering 5 questions.

Table 1

	CREATIVITY INDICATORS		
	FLUENCY	FLEXIBILITY	ORIGINALITY
MOVEMENT ELEMENTS INDICATORS	1. Number of different responses	1. shape	1. shape
		2. space	2. space
		3. time	3. time
		4. flow	4. flow
		5. weight	5. weight

You will be given one booklet per child (35 total), each booklet contains four sets of rating questions corresponding to the four words presented to each child. In addition, at the end of the booklet, space is provided for you to express any comments and/or suggestions you might have regarding the study.

The Task:

For each one of the four words presented to each child, the child was told the following:

"Show me with your body movements whatever comes to your mind when I say the word_____."

This statement was followed up with questions such as "Can you show me another way?", "Is there anything else you would like to show me about the word _____?".

Please see below for definition of the observational criteria.

Guilford's Indicators of Creativity:

1. Fluency (number of movement responses): In this research project, **fluency** is the ability to produce a **number of different movement responses** during a physical expression of a word. Fluency measures quantity and diversity of movements.

2. Flexibility (different changes in movement): Flexibility can be seen as the ability to produce **different changes in movement**(s) as the child physically expresses a word. When rating flexibility, please look at and rate the different changes in the use of the specific elements of movement. For example, look for a change from a small body shape to a big body shape in the child's movement (see pages 4 and 5 for more details on the elements).

3. Originality (unusual/unfamiliar ways of moving): Originality can be seen as the ability to produce **"new, unique, unusual responses"** to a movement task. The degree of originality in movement can be seen as **unfamiliar** movements or **unfamiliar** ways of physically expressing a word in movement. In other words, please rely on your knowledge and experience to **identify** an "unfamiliar, new, unique or unusual" movement. Try to spot what is not well known and commonly used among children's vocabulary of movements.

Laban's Elements of Movement and its Effort Qualities:

The following elements are employed in this observational study as ways of interpreting and rating how **expressive** the child's movement appears to you. In order to rate physical expression of concepts please take into account the following definitions of movement elements.

1. Shape : It can be identified by the manner the whole body is arranged or its parts are arranged in relationship to each other – in a wide, long, round, twisted, symmetrical or asymmetrical shape. What should be observed is the child's ability to use those shapes appropriately, varying between wide, long, round, twisted, symmetrical or asymmetrical shapes according to the concept being expressed. A **great variety** in the use of those shapes should be rated **excellent (# 5)**.

2. Space : It involves the recognition of the general and the personal space. The **general space** is the space surrounding us, the space where our bodies move around. Thus, one can explore the air pathways, floor pathways and changes of levels in the general space. The **personal space** is space our body takes up. Thus, one can explore changes in movement between levels, pathways, and directions within one's self-space.

For example:
Spatial Levels: low, medium, high,
Spatial Pathways: floor patterns and air patterns
Directions: forward, backwards, sideways.

Excellent (#5) should be given to **greater exploration of space levels, pathways, and directions**.

3. Time : It is the rate at which a movement is performed; for example, we can use the following oppositions to characterize the time element: fast-slow, constant-changing, gradual-sudden. What should be observed is the child's ability to use time appropriately, varying between fast to slow, constant to changing, or gradual to sudden tempo according to the concept being expressed. A very **adequate use of time** should be rated **excellent (# 5)**.

4. Flow : The flow of movement can be rated based on the qualitative changes between bound or free. The bound movement is "stoppable". It is a controlled movement. The free movement is "free-flowing", "ongoing", uncontrolled type of movement.

For example:
In the Bound movement the child runs, runs and suddenly he/she stops, and freezes.
In the Free movement the child continuously and smoothly moves in a sustained tempo.

What should be observed is the child's ability to use flow qualities appropriately, varying between bound to free according to the concept being expressed. An **appropriate use of flow qualities** should be rated **excellent (# 5)**.

5. Weight : It is an effort quality which can be identified by the transfer of energy through the body and its parts.

> **Heavy movement** can be identified when the child tries to physically express the concept of an elephant, for instance. He/she would have to move "heavily".
> **Light movement** can be identified when the child tries to physically express the concept of a bird, for instance. He/she would have to move in a "light" way.

What should be observed is the child's ability to use weight appropriately, varying between heavy and light according to the concept being expressed. An **appropriate use of weight** should be rated **excellent (# 5)**.

Please familiarize yourself with these definitions and with the Ratings booklet before proceeding with the ratings.

Appendix L: Raw and Standard TGMD data for individual members of each group

Ballet		
Participant	Raw	Std
1	22	11
2	16.75	9
3	21	10
4	19.5	9
5	18	10
6	17	9
7	17	7
8	20.75	10
9	17	7
10	21.75	11
11	16.5	7

Creative Dance		
Participant	Raw	Std
1	18.5	10
2	15	7
3	26	15
4	18.25	8
5	13	6
6	10.25	4
7	14.5	7
8	19.25	8
9	13.75	7
10	15.75	6
11	17	7
12	12	5

No Dance		
Participant	Raw	Std
1	14.75	7
2	12.5	6
3	13.75	5
4	15.25	5
5	15	5
6	18.5	10
7	17.5	10
8	17.75	8
9	19.25	10
10	13.75	5
11	16.5	7
12	17.75	8

Appendix M: Norms for TCAM's three main creativity criteria: Means (and Standard Deviations) for Children Six and Seven Years of Age

AGE	TCAM	FLUENCY		ORIGINALITY		IMAGINATION	
(years)	Sample (*N*)	Mean	SD	Mean	SD	Mean	SD
6	155	34.2	17.2	39.7	24.7	23.7	5.5
7	117	37.3	20.5	40.4	34.5	23.1	5.5